



BRIDGESTONE AMERICAS, INC.  
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Nashville, TN 37201

Jane M. Johnson  
615-937-1856

January 22, 2018

John Hopkins  
Land and Chemicals Division, USEPA Region III  
1650 Arch Street (3LC20)  
Philadelphia, PA 19103

**Re: Quarterly Progress Report #36**  
October 1 – December 31, 2017  
Former Allied Signal Fibers Plant  
105 Winston Churchill Drive  
Hopewell, Virginia 23860  
USEPA ID# VAD003112588

Dear Mr. Hopkins:

Attached, as required by Section II, Task IV of Facility Lead, Corrective Measures Implementation Agreement (FLA), please find the Quarterly Progress Report #36 for the time period of October 1 through December 31, 2017 for the above referenced site.

I certify under a penalty of law that Quarterly Progress Report #36 was prepared under my direction or supervision in accordance to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Please contact me if you have any questions or additional thoughts regarding the Quarterly Progress Report.

Sincerely,

Jane M. Johnson

Cc: Norm Kennel, EarthCon Consultants, Inc.

## **QUARTERLY PROGRESS REPORT #36**

**Former Allied Signal Fibers Plant  
Hopewell, Virginia  
USEPA ID#: VAD003112588**

### **Section 1 – Purpose of Quarterly Report**

This Quarterly Progress Report (QPR) was prepared by Bridgestone Americas Tire Operations, LLC (BATO) to comply with BATO's reporting requirements under Section II, Task IV of Facility Lead, Corrective Measures Implementation Agreement (FLA), effective December 16, 2008, for the former Allied Signal Fibers Plant.

### **Section 2 - Introduction and Background**

The Former Allied Signal Fibers Plant consists of an approximately 37-acre parcel of land located at 105 Winston Churchill Drive in Hopewell, Virginia (site).

On February 22, 2006, United States Environmental Protection Agency (USEPA) issued a Notice of Intent to issue a Final Determination for the site. The proposed remedy was monitored natural attenuation with controls. The public comment period lasted 45 days, which ended on April 7, 2006. There were no comments on the proposed Final Determination.

During the development of the FLA, BATO, formerly Bridgestone Americas North American Tire, LLC, developed and submitted a CMI Work Plan (Groundwater Monitored Natural Attenuation Plan, dated August 18, 2008) to USEPA. On August 19, 2008, USEPA approved the CMI Work Plan. The CMI Work Plan was implemented in October 2008 when the baseline groundwater monitoring event was conducted.

On December 16, 2008, following the sale of the site, BATO submitted a Letter of Commitment to USEPA. The Letter of Commitment outlined the Sections of the FLA that BATO intends to comply with as the former Owner/Operator.

In a letter dated February 5, 2009, BATO indicated that the site work performed to date by BATO met the requirements of Section II; Tasks I, II, and III of the FLA. On February 5, 2009 USEPA indicated that they were in agreement with this assessment and that BATO would be required to complete progress reports in accordance with Section II, Task IV of the FLA.

The third and final CMI Work Plan required groundwater monitoring event was conducted in November 2010. The November 2010 sampling event concluded the required groundwater monitoring activities under the CMI Work Plan. In accordance with the CMI Work Plan, a Comprehensive Natural Attenuation Evaluation Report (CNAER) was prepared during this reporting period. The CNAER was included in the Corrective Measures Completion Report (CMCR) which was sent to USEPA in April 2011. BATO received USEPA's comments in June 2011 and responded in July 2011 with a proposal to continue groundwater monitoring.

The EPA responded on August 4, 2011 that BATO's plans were sufficient to address the comments on the CMR. USEPA requested that groundwater samples be collected from the same groundwater monitoring wells utilized in the CMI Work Plan network (with the exception of HPMW-04 which could be discontinued) and that BATO should submit the data to USEPA for evaluation of Site closure once two consecutive years of groundwater concentrations below the MCLs were received.

On August 9, 2016, EPA conducted a long-term stewardship site visit with BATO's environmental contractor and Dominion Virginia Power representatives to inspect some of the monitoring wells and discuss and assess the status of the remedy implementation at the site. On August 30, 2016 EPA issued a site visit follow-up Long-Term Stewardship Assessment Report (EPA Report) for the site. The August 30, 2016 EPA Report included the following:

*Conclusions and Recommendations: No EC/IC deficiencies were identified. EPA has determined that the remedy EC/ICs have been and are being implemented. EPA recommends that Firestone:*

1. *Include historical trend graphs for exceeding constituents at monitoring wells ASMW-01R, ASMW-02 and ASMW-03 in future groundwater reports.*
2. *Include concentration contours on a site map for exceeding constituents in future groundwater reports.*

In a letter dated September 18, 2017, following an analysis of groundwater data, BATO informed the EPA of its intent to amend the 2017 sampling plan by reducing the number of wells sampled and to discontinue analysis for 1,4-Dioxane. On November 1, 2017 EPA approved BATO's request to reduce the monitoring well network and constituents sampled indicating:

*For future sampling events, the monitoring well network will include ASMR-01R, ASMW-02, and ASMW-04. Also, 1,4-Dioxane is no longer required to be sampled.*

This Quarterly Progress Report complies with the Section II, Task IV of FLA for the period of October 1 through December 31, 2017. Section 3 of this Quarterly Progress Report summarizes work performed during this reporting period. Section 4 discusses any projected work for the next reporting period.

### **Section 3 – Work Performed during this Reporting Period**

In accordance with the August 2011 letter and USEPA's November 1, 2017 response to BATO's revised groundwater monitoring program request, groundwater samples were collected in November 2017 from the revised groundwater monitoring well network, see **Figures 1 and 2**. Wells were sampled for site VOCs, nitrate, alkalinity, chloride, sulfate, sulfide, TOC and dissolved gasses. Groundwater samples were submitted to Air, Water and Soil Laboratories. Field parameters were analyzed during well purging with a YSI multiparameter groundwater quality meter.

Analytical results from the November 2017 sampling event indicate that detected VOC 1,1-Dichloroethene concentrations in samples collected from monitoring wells ASMW-01R, ASMW-02, and ASMW-04 were above the EPA MCL. The detected concentrations of 1,1-Dichloroethene, as well as other detected constituents are shown on **Figure 3**. Well ASMW-01R also exhibited concentrations of carbon tetrachloride and trichloroethene slightly above the EPA MCL. A duplicate sample was collected from ASMW-01R, the carbon tetrachloride concentration was below the EPA MCL in the duplicate sample. A 1,1-dichloroethene isoconcentration map is included as **Figure 4**. A historical trend graph chart for 1,1-Dichloroethene is included as **Figure 5**.

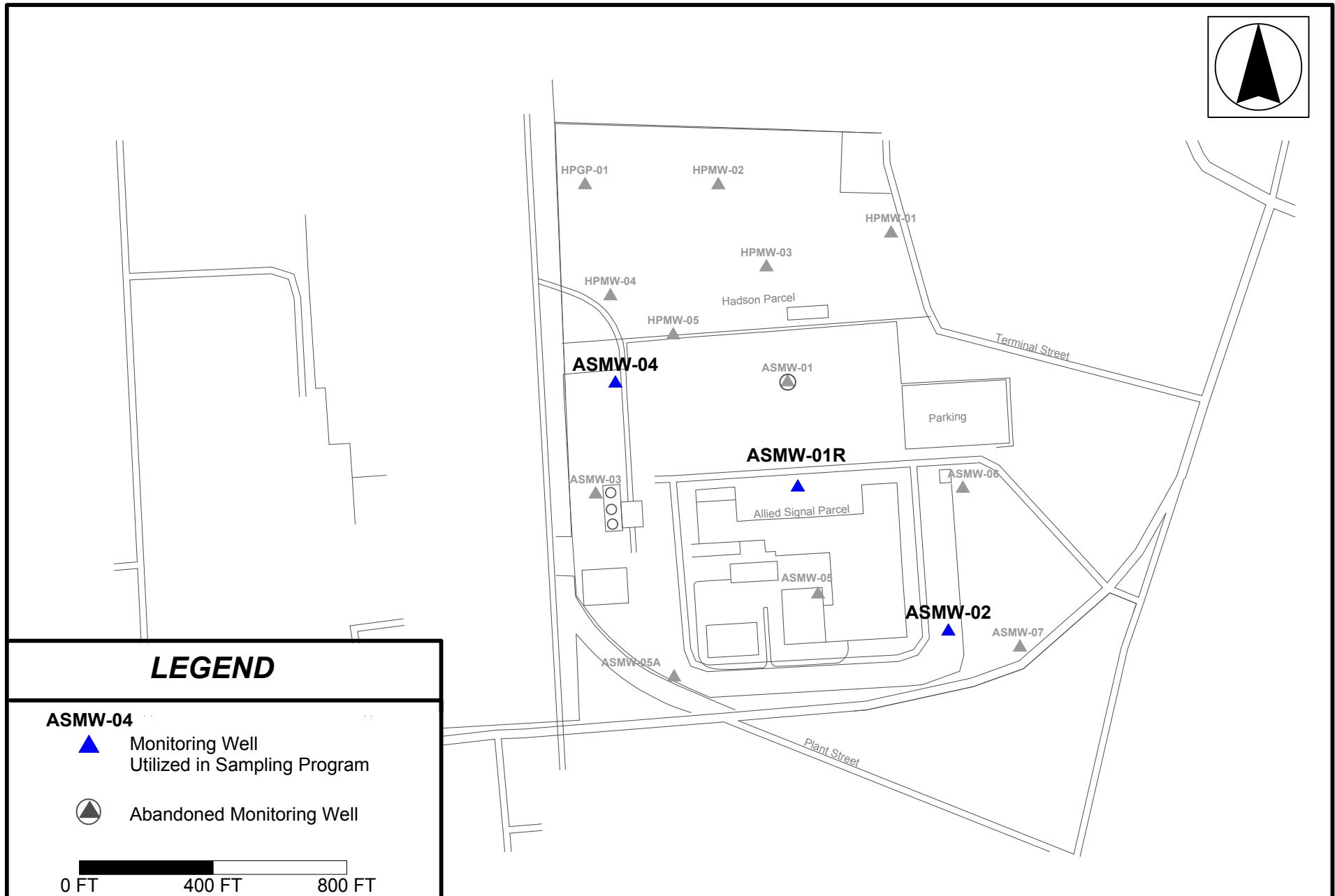
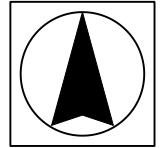
November 2017 analytical results and observed field measurements are summarized in **Table 1**. A historical summary of analytical results and observed field measurements can be found in **Table 2**. The data validation memo and original lab results are included as **Appendix A** and **Appendix B**, respectively.

#### **Section 4 – Projected Work for next Reporting Period**

None Anticipated

#### **Attachments:**

- Figure 1      Site Plan and Monitoring Locations**
- Figure 2      Potentiometric Surface Map – November 2017**
- Figure 3      Detected Constituents**
- Figure 4      1,1-Dichloroethene Isoconcentration Map**
- Figure 5      1,1-Dichloroethene Historic Concentration Chart**
- Table 1      Summary of 2017 Groundwater Sampling Results**
- Table 2      Historical Summary of Groundwater Sampling Results**
- Appendix A    Data Validation Memo**
- Appendix B    Laboratory Analytical Results from Annual Groundwater Sampling**



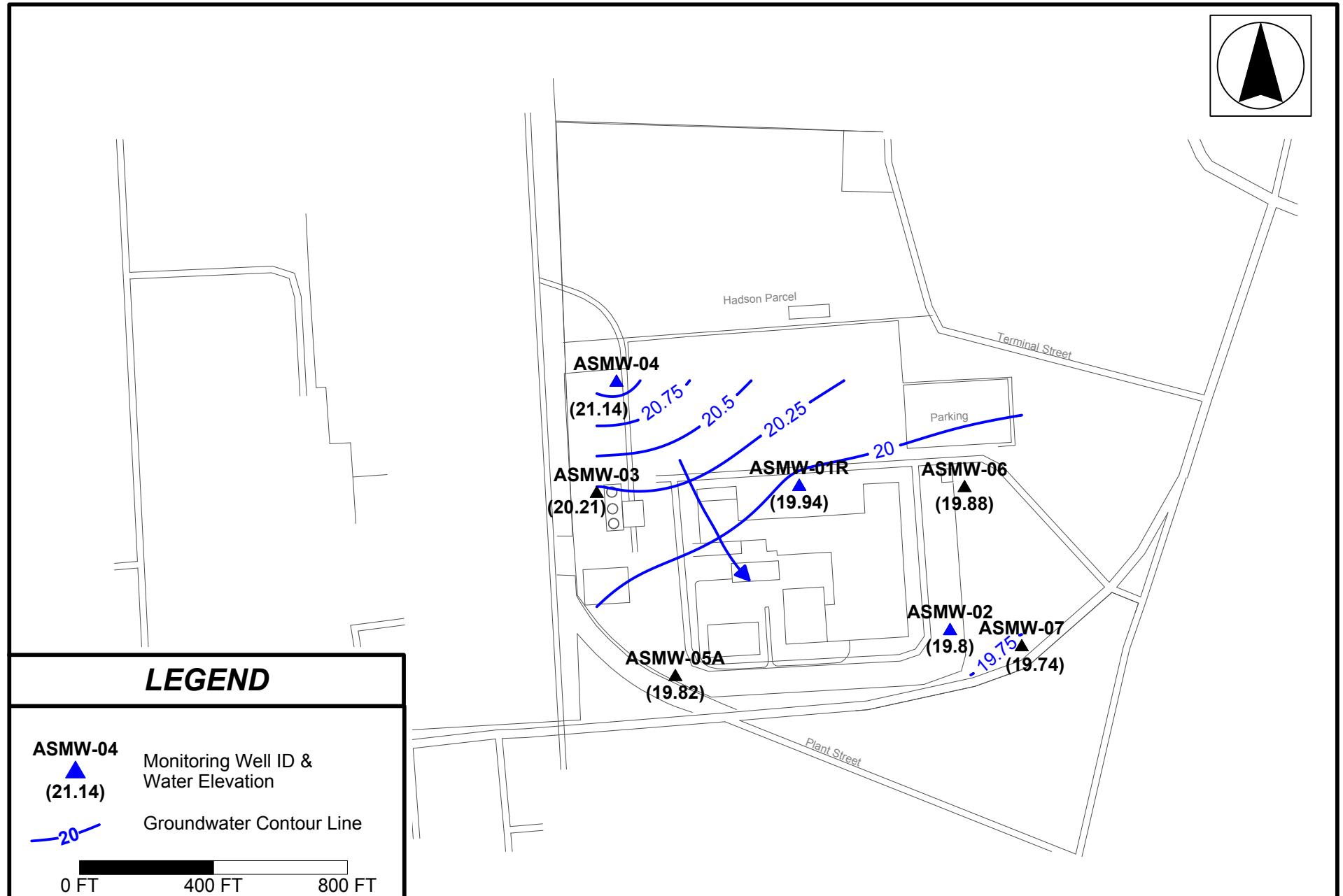
**Figure 1**  
**Site Map**

**Former Allied Signal Fibers Plant  
Hopewell, VA**

Date: 11/30/2017  
Project No.  
02.20980007.00

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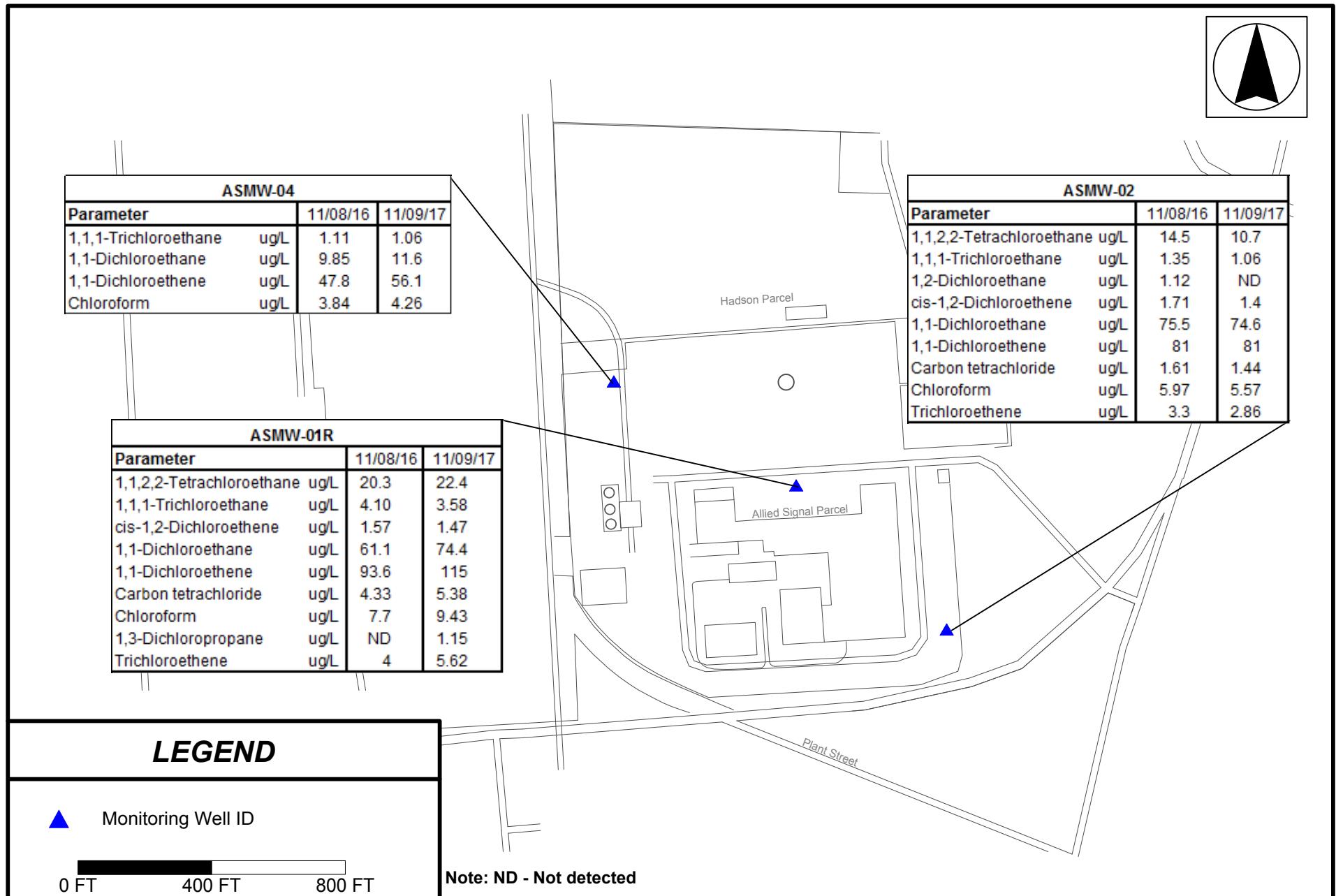
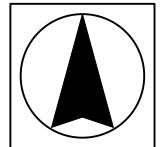


**Figure 2**  
Former Allied Signal Fibers Plant  
Hopewell, VA

Date: 11/30/2017  
Project No.  
02.20980007.00

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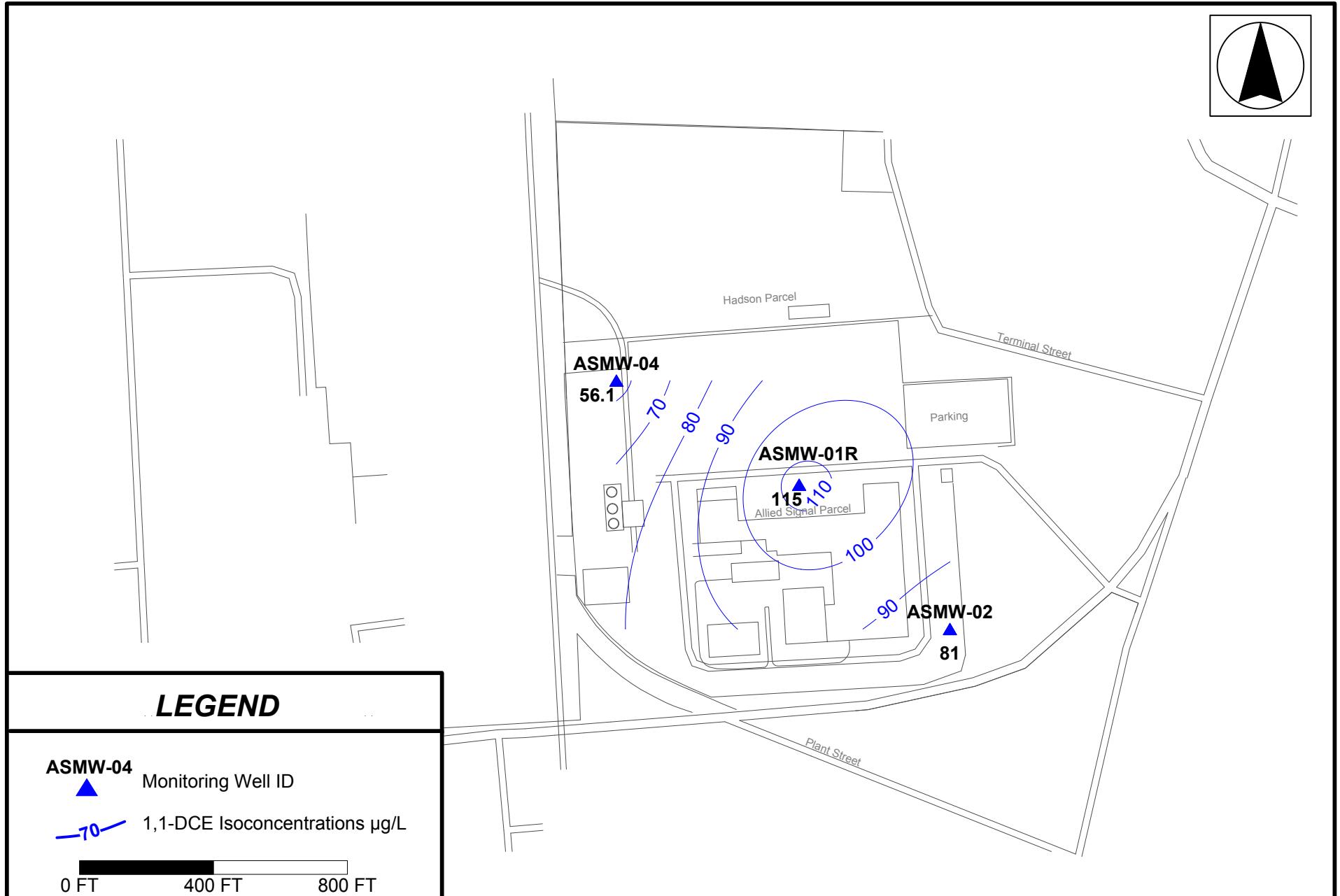
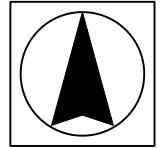
**Figure 3**  
**Detected Constituent Concentration Map**

**Former Allied Signal Fibers Plant  
Hopewell, VA**

Date: 11/30/2017  
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02.2098007.00



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**Figure 4**  
1,1-DCE Isoconcentration Map

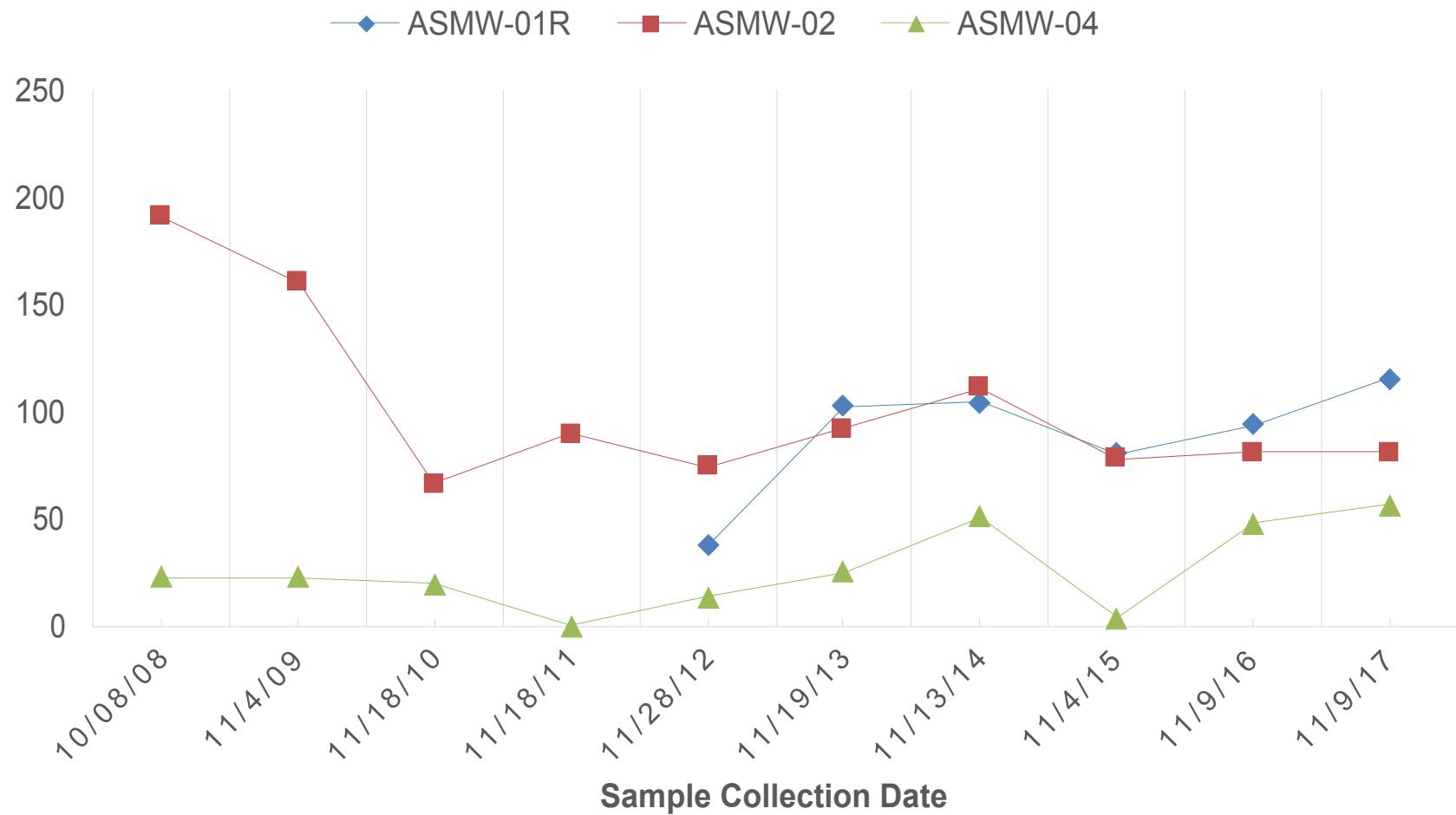
Former Allied Signal Fibers Plant  
Hopewell, VA

Date: 11/30/2017  
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# 1,1-Dichloroethene Concentration



**Figure 5**  
1,1-Dichloroethene  
Historic Concentrations

Former Allied Signal Fibers Plant  
Hopewell, VA

Date: 11/30/2017  
Project No.  
02.2098007.00



**Table 1- Summary of 2017 Groundwater Sampling Results**

Parameter	Method	Units	Station ID	CVOC	ASMW-01R	ASMW-01R	ASMW-02	ASMW-04		
			Sample ID	MCLs	ASMW-01R	DUP-1	ASMW-02	ASMW-04		
			Date Collected		11/9/2017	11/9/2017	11/9/2017	11/9/2017		
<i>Volatile Organic Compounds</i>										
Ethane Dechlorination Series										
1,1,2,2-Tetrachloroethane	SW8260B	ug/L	--	22.4	21.9	10.7	0.4	U		
1,1,2-Trichloroethane	SW8260B	ug/L	5	1 U	1 U	1 U	1	U		
1,1,1-Trichloroethane	SW8260B	ug/L	200	3.58	3.25	1.06	1.06			
1,2-Dichloroethane	SW8260B	ug/L	5	1 U	1 U	1 U	1	U		
1,1-Dichloroethane	SW8260B	ug/L	--	74.4	68.8	74.6	11.6			
1,1-Dichloroethene	SW8260B	ug/L	7	115	107	81	56.1			
1,3-Dichloropropane	SW8260B	ug/L	--	1.15	1 U	1 U	1	U		
Chloroethane	SW8260B	ug/L	--	1 U	1 U	1 U	1	U		
Methane Dechlorination Series										
Carbon tetrachloride	SW8260B	ug/L	5	5.38	4.8	1.44	1	U		
Chloroform	SW8260B	ug/L	--	9.43	8.9	5.57	4.26			
Ethene Dechlorination Series										
Trichloroethylene	SW8260B	ug/L	5	5.62	5.15	2.86	1	U		
cis-1,2-Dichloroethylene	SW8260B	ug/L	70	1.47	1 U	1.4	1	U		
trans-1,2-Dichloroethylene	SW8260B	ug/L	100	1 U	1.47 U	1 U	1	U		
Vinyl chloride	SW8260B	ug/L	2	0.5 U	0.5 U	0.5 U	0.5	U		
<i>MNA Constituents</i>										
Nitrate	Calculated	mg/L	--	2.22	2.1	2.19	4.8			
Nitrite	SM18/4500-NO2 B	mg/L	--	0.05 U	0.05 U	0.05 U	0.05	U		
Nitrate+Nitrite	SM18/4500-NO3 F	mg/L	--	2.22	2.1	2.19	4.8			
Ferrous Iron	Field Measurement	mg/L	--	0	0	0.02	0.09			
Sulfate	EPA300.0/R2.1	mg/L	--	424	421	614	161			
Sulfide	SM18/4500-S2 E	mg/L	--	1 U	1 U	1 U	1	U		
Chloride	EPA300.0/R2.1	mg/L	--	39.8	34.7	44.9	520			
Ammonia		mg/L	--	NA	NA	NA	NA			
Alkalinity	SM18/2320B	mg/L	--	29	13	8	99			
Total Organic Carbon (TOC)	SW9060	mg/L	--	2.4	2.4	2.2	2.6			
Dissolved Oxygen (DO)	Field Measurement	mV		1.01	1.01	1.43	1.22			
Oxidation Reduction Potential	Field Measurement	mV	--	220	220	203.6	149.3			
Turbidity	Field Measurement	NTU	--	6.9	6.9	538	64			
pH	Field Measurement	SU	--	5.36	5.36	5.17	6.06			
Specific Conductance	Field Measurement	uS/cm	--	956	956	1180	176.1			
<i>Dissolved Gases</i>										
Methane	RSK-175	ug/L	--	15.8	14.1	10.4	5	U		
Ethene	RSK-175	ug/L	--	5 U	5 U	5 U	5	U		
Ethane	RSK-175	ug/L	--	5 U	5 U	5 U	5	U		

Notes:

U - Not detected above the listed reporting limit

J - Estimated value

NA - Not analyzed

SU - Standard pH units

NTU- Nephelometric Turbidity Units

Results are validated

Table 2. Historical Summary of Groundwater Sampling Results

Parameter	Method	Station ID	CVOC	ASMW-01	ASMW-02	ASMW-03	ASMW-04	ASMW-5A	ASMW-06	ASMW-07	HPMW-01	HPMW-01	HPMW-02	HPMW-04	
		Sample ID	MCLs	ASMW-01	ASMW-02	ASMW-03	ASMW-04	ASMW-5A	ASMW-06	ASMW-07	DUP-1	HPMW-01	HPMW-01	HPMW-02	HPMW-04
		Date	Units	10/08/08	10/08/08	10/08/08	10/08/08	10/08/08	10/08/08	10/07/08	10/08/08	10/08/08	10/07/08	10/07/08	10/07/08
<i>Volatile Organic Compounds</i>															
Ethane Dechlorination Series															
1,1,2,2-Tetrachloroethane	SW8260B	µg/L	--	4.4	30.4	0.3 U									
1,1,2-Trichloroethane	SW8260B	µg/L	5	1	1.7	0.2 U									
1,1,1-Trichloroethane	SW8260B	µg/L	200	1.7	2.6	0.2 U									
1,2-Dichloroethane	SW8260B	µg/L	5	1.5	1.6	0.3 U	0.4 J	0.3 U	0.3 U	0.3 U					
1,1-Dichloroethane	SW8260B	µg/L	--	159	215	0.2 U	3.7	1.9	0.2 U	0.7 J	45.1	47.1	2.9	0.2 U	
1,1-Dichloroethene	SW8260B	µg/L	7	96.4	191	0.6 J	22.3	3.5	0.2 U	0.8 J	21.4	22	23.4	2	
Chloroethane	SW8260B	µg/L	--	0.5 J	0.2 U										
Methane Dechlorination Series															
Carbon tetrachloride	SW8260B	µg/L	5	0.8 J	5.3	0.2 U									
Chloroform	SW8260B	µg/L	--	2.4 U	8 U	1 U	1.3 U	1 U	0.2 U	0.2 U	1 U	1 U	1 U	0.2 U	
Ethene Dechlorination Series															
Trichloroethylene	SW8260B	µg/L	5	2.3	6.6	0.2 U	0.9 J	1 J	2.1	0.2 U					
cis-1,2-Dichloroethylene	SW8260B	µg/L	70	0.6 J	4.4	0.2 U	0.7 J	0.7 J	0.2 U	0.2 U					
trans-1,2-Dichloroethylene	SW8260B	µg/L	100	0.2 U	0.5 J	0.2 U									
Vinyl chloride	SW8260B	µg/L	2	0.2 J	0.5 J	0.2 U									
<i>MNA Constituents</i>															
Nitrate	Calculated	mg/L	--	18	0.9	8.7	4.4	13.2	0.1 U	0.6	NA	0.1 U	69	6.5	
Nitrite	SM18/4500-NO2 B	mg/L	--	0.05 U	NA	0.05 U	0.05 U	0.05 U							
Nitrate+Nitrite	SM18/4500-NO3 F	mg/L	--	18	0.9	8.7	4.4	13.2	0.1 U	0.6	NA	0.1 U	69	6.5	
Ferrous Iron		mg/L	--	0.12	0.41	0.35	0.11	0.44	0.27	0.62	NA	0.74	0	0.24	
Sulfate	EPA300.0/R2.1	mg/L	--	1250 J	920 J	158 J	21 J	414 J	130 J	503 J	NA	384 J	343 J	75.2 J	
Sulfide	SM18/4500-S2 E	mg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	1 U	1 U	1 U	
Chloride	EPA300.0/R2.1	mg/L	--	32.7 J	63.4 J	42.3 J	825 J	43.8 J	76.6 J	40.9 J	NA	69.7 J	85.2 J	15.9 J	
Ammonia		mg/L	--	NA											
Alkalinity	SM18/2320B	mg/L	--	106	19	5 U	83.6	5 U	125	33.2	NA	89	33	38	
Total Organic Carbon (TOC)	SW9060	mg/L	--	1.9	2.8	1 U	1.1	1.3	3.9	2.1	NA	2	1.5	1 U	
Dissolved Oxygen (DO)	Field Measurement	mV	--	0.71	0.56	0.48	1.0	0.51	0.61	0.57	NA	0.7	329.4	4.1	
Oxidation Reduction Potential	Field Measurement	mg/L	--	51.4	138.6	146.1	137	136.9	75	177	NA	47.1	1.05	84.1	
Turbidity	Field Measurement	NTU	--	>999	468	213	610	>999	45.1	>999	NA	81.4	>999	>999	
pH	Field Measurement	STU	--	6.21	4.81	4.31	5.91	4.52	5.9	5.19	NA	5.78	5.58	5.64	
Specific Conductance	Field Measurement	µS/cm	--	2722	1945	576	2864	1068	771	1,350	NA	1094	1574	325	
<i>Dissolved Gases</i>															
Methane	RSK-175	µg/L	--	4.8	36.9	0.5 U	0.5 U	8.1	0.5 U	0.5 U	NA	53.6	0.5 U	0.5 U	
Ethene	RSK-175	µg/L	--	0.5 U	NA	0.5 U	0.5 U	0.5 U							
Ethane	RSK-175	µg/L	--	0.5 U	NA	0.5 U	0.5 U	0.5 U							
<i>Dioxane</i>															
1,4-Dioxane	SW8260B	µg/L	--	108	119	137	20 U	64.6	20 U	20 U	27.6 J	28.1 J	20 U	20 U	

## Notes:

U - Not detected above the listed reporting limit

J - Estimated value

UJ - Estimated reporting limit

NA - Not analyzed

STU - Standard pH units

Results are validated

Table 2. Historical Summary of Groundwater Sampling Results

Parameter	Method	Station ID	CVOC	ASMW-01	ASMW-02	ASMW-03	ASMW-04	ASMW-05A	ASMW-06	ASMW-07	HPMW-01	HPMW-02	HPMW-02	HPMW-04
		Sample ID	MCLs	ASMW-01	ASMW-02	ASMW-03	ASMW-04	ASMW-05A	ASMW-06	ASMW-07	HPMW-01	HPMW-02	110409 DUP	HPMW-04
			Date	11/4/2009	11/4/2009	11/3/2009	11/3/2009	11/3/2009	11/4/2009	11/4/2009	11/4/2009	11/4/2009	11/4/2009	11/4/2009
<i>Volatile Organic Compounds</i>														
Ethane Dechlorination Series														
1,1,2,2-Tetrachloroethane	SW8260B	µg/L	--	3.8	29.3	0.3 U	0.3 U							
1,1,2-Trichloroethane	SW8260B	µg/L	5	1	1.5	0.2 U	0.2 U							
1,1,1-Trichloroethane	SW8260B	µg/L	200	1.3	2.4	0.2 U	0.7 J	0.2 U	1.8	1.8				
1,2-Dichloroethane	SW8260B	µg/L	5	1.4	1.4	0.3 U	0.3 U							
1,1-Dichloroethane	SW8260B	µg/L	--	126	176	0.2 U	3.8	1.4	0.2 U	0.8 J	32.9	2.1	2.3	0.2 U
1,1-Dichloroethylene	SW8260B	µg/L	7	71.1	160	0.3 J	22.3	2.3	0.2 U	0.8 J	15.3	19.4	21.9	1.1
Chloroethane	SW8260B	µg/L	--	0.3	J	0.2 U	0.2 U							
Methane Dechlorination Series			--											
Carbon tetrachloride	SW8260B	µg/L	5	0.6	J	4.1	0.2 U	0.2 U						
Chloroform	SW8260B	µg/L	--	1.9		7.9	0.5 J	1.5	0.7 J	0.2 U	0.2 U	0.5 J	1 J	1 J
Ethene Dechlorination Series			--											
Trichloroethylene	SW8260B	µg/L	5	1.6	6	0.2 U	0.6 J	2.6	2.7	0.2 U				
cis-1,2-Dichloroethylene	SW8260B	µg/L	70	0.6	J	4.1	0.2 U	0.2 U	0.2 U	0.2 U	0.5 J	0.2 U	0.2 U	0.2 U
trans-1,2-Dichloroethylene	SW8260B	µg/L	100	0.2	U	0.4 J	0.2 U	0.2 U						
Vinyl chloride	SW8260B	µg/L	2	0.2	U	0.4 J	0.2 U	0.2 U						
<i>MNA Constituents</i>														
Nitrate	Calculated	mg/L	--	1.5	1.1	7	4.3	12	0.1 U	0.7	0.1 U	77.6	NA	9.2
Nitrite	SM18/4500-N02 B	mg/L	--	0.05	U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA	0.05 U
Nitrate+Nitrite	SM18/4500-NO3 F	mg/L	--	1.5	1.1	7	4.3	12	0.1 U	0.7	0.1 U	77.6	NA	9.2
Ferrous Iron		mg/L	--	0.59	0.3	0.23	0.24	0.47	0.46	0.2	0.98	0.23	NA	0.05
Sulfate	EPA300.0/R2.1	mg/L	--	1230	841	153	21	352	140	424	307	262	NA	57.3
Sulfide	SM18/4500-S2 E	mg/L	--	1	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	1 U
Chloride	EPA300.0/R2.1	mg/L	--	28.7	62.1	38.7	815	38.8	73.3	31.1	57	96.8	NA	16
Ammonia		mg/L	--	NA	NA									
Alkalinity	SM18/2320B	mg/L	--	100	16.5	5 U	85	5 U	120	18.5	38.4	22	NA	35.8
Total Organic Carbon (TOC)	SW9060	mg/L	--	1.7	3	1.1	1.4	1.3	4.3	2	1.7	1 U	NA	2.6
Dissolved Oxygen (DO)	Field Measurement	mV	--	0	0	3.97	0	0	0	5.06	0	577	NA	3.9
Oxidation Reduction Potential	Field Measurement	mg/L	--	128	199	383	235	390	84	28	128	0	NA	180
Turbidity	Field Measurement	NTU	--	0	181	42.4	491	316	50.7	174	0	276	NA	0
pH	Field Measurement	STU	--	5.70	4.7	4.44	6.15	3.57	5.89	4.91	5.7	4.56	NA	5.1
Specific Conductance	Field Measurement	µS/cm	--	982	1990	528	2750	1000	768	1,210	982	1540	NA	350
<i>Dissolved Gases</i>														
Methane	RSK-175	µg/L	--	3.9	49.0	2.9	0.5 U	0.7	0.5 U	0.5 U	24.2	2.2	NA	0.5 U
Ethene	RSK-175	µg/L	--	0.5	U	2.5 U	0.5 U	NA	0.5 U					
Ethane	RSK-175	µg/L	--	0.5	U	2.5 U	0.5 U	NA	0.5 U					
<i>Dioxane</i>														
1,4-Dioxane	SW8260B	µg/L	---	94.3	126	117	4 U	45	4 UJ	5.44	18	4 U	NA	4 U

## Notes:

U - Not detected above the listed reporting limit

J - Estimated value

UJ - Estimated reporting limit

NA - Not analyzed

STU - Standard pH units

Results are validated

Table 2. Historical Summary of Groundwater Sampling Results

Parameter	Method	Station ID	CVOC	ASMW-01	ASMW-01	ASMW-02	ASMW-03	ASMW-04	ASMW-05A	ASMW-06	ASMW-07	HPMW-01	HPMW-02	HPMW-04
		Sample ID	MCLs	ASMW-01	111810 DUP	ASMW-02	ASMW-03	ASMW-04	ASMW-05A	ASMW-06	ASMW-07	HPMW-01	HPMW-02	HPMW-04
		Date		11/18/2010		11/18/2010	11/18/2010	11/18/2010	11/18/2010	11/18/2010	11/18/2010	11/18/2010	11/18/2010	11/18/2010
<i>Volatile Organic Compounds</i>														
Ethane Dechlorination Series														
1,1,2,2-Tetrachloroethane	SW8260B	µg/L	--	3.2	3	10.3	8.5 U	0.3 U						
1,1,2-Trichloroethane	SW8260B	µg/L	5	0.8 J	0.8 J	0.8 J	0.2 U							
1,1,1-Trichloroethane	SW8260B	µg/L	200	0.8 J	0.9 J	0.9 J	0.2 U	0.6 J	0.2 U	0.2 U	0.2 U	0.2 U	1.6	0.2 U
1,2-Dichloroethane	SW8260B	µg/L	5	0.8 J	0.9 J	0.7 J	0.3 U	0.2 U						
1,1-Dichloroethane	SW8260B	µg/L	--	92.3	93.9	82.7	0.2 U	3.5	1.3	0.3 U	0.5 J	17.8	3.2	0.2 U
1,1-Dichloroethene	SW8260B	µg/L	7	53.6	50.9	65.8	0.3 J	19.1	2.0	0.2 U	0.4 J	8.1	14.8	0.6 J
Chloroethane	SW8260B	µg/L	--	0.2 J	0.3 J	0.2 J	0.2 U							
Methane Dechlorination Series														
Carbon tetrachloride	SW8260B	µg/L	5	0.7 J	0.8 J	0.9 J	0.2 U							
Chloroform	SW8260B	µg/L	--	1.8	1.9	3.4	0.4 J	1.3	0.6 J	0.2 U	0.2 U	0.3 J	0.7 J	0.2 U
Ethene Dechlorination Series														
Trichloroethylene	SW8260B	µg/L	5	1.7	1.7	2.9	0.2 U	0.5 J	1.2	0.2 U				
cis-1,2-Dichloroethylene	SW8260B	µg/L	70	0.5 J	0.4 J	2.0	0.2 U	0.4 J	0.2 U	0.2 U				
trans-1,2-Dichloroethylene	SW8260B	µg/L	100	0.2 U	0.2 U	0.2 J	0.2 U							
Vinyl chloride	SW8260B	µg/L	2	0.2 U										
<i>MNA Constituents</i>														
Nitrate	Calculated	mg/L	--	1.6	NA	0.6	7.7	4.5	12.3	0.1 U	0.7	0.1 U	61	10.1
Nitrite	SM18/4500-NO2 B	mg/L	--	0.05 U	NA	0.05 U								
Nitrate+Nitrite	SM18/4500-NO3 F	mg/L	--	1.6	NA	0.6	7.7	4.5	12.3	0.1 U	0.7	0.1 U	61	10.1
Ferrous Iron		mg/L	--	0.07	NA	0.67	0.49	0.18	0	0.64	0	1.6	0.3	0.32
Sulfate	EPA300.0/R2.1	mg/L	--	1340	NA	1590	157	22.7	436	108	612	302	821	66.4
Sulfide	SM18/4500-S2 E	mg/L	--	1 U	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloride	EPA300.0/R2.1	mg/L	--	29.4	NA	69.8	35.1	899	40.5	72.8	36	46.1	117	16.9
Ammonia		mg/L	--	NA										
Alkalinity	SM18/2320B	mg/L	--	86.6	NA	6	5 U	83.8	5 U	121	5 U	49.6	5 U	34.4
Total Organic Carbon (TOC)	SW9060	mg/L	--	1.9	NA	2.6	1.2	1 U	1.6	4.4	2.4	1.9	3.1	1 U
Dissolved Oxygen (DO)	Field Measurement	mV	--	2.61	NA	2.48	3.67	2.06	2.71	2.11	2.98	2.06	549	8.73
Oxidation Reduction Potential	Field Measurement	mg/L	--	144	NA	163	270	114	205	63	168	114	1.32	104
Turbidity	Field Measurement	NTU	--	431	NA	612	457	727	2000	99.1	951	102	2000	358
pH	Field Measurement	STU	--	5.98	NA	4.93	4.23	5.8	4.34	5.8	4.89	5.56	4.34	5.63
Specific Conductance	Field Measurement	µS/cm	--	2460	NA	1700	505	2730	1030	700	1,187	781	2000	338
<i>Dissolved Gases</i>														
Methane	RSK-175	µg/L	--	0.8	NA	19.3	4.8	0.5 U	25.1	0.5 U	0.5 U	20.9	6.2	0.5 U
Ethene	RSK-175	µg/L	--	0.5 U	NA	2.5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U
Ethane	RSK-175	µg/L	--	0.5 U	NA	2.5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U
<i>Dioxane</i>														
1,4-Dioxane	SW8260B	µg/L	---	87.7	87.2	81.1	83.8	4 U	43	4 U	9.26	12.4	4 U	

## Notes:

U - Not detected above the listed reporting limit

J - Estimated value

UJ - Estimated reporting limit

NA - Not analyzed

STU - Standard pH units

Results are validated

Table 2. Historical Summary of Groundwater Sampling Results

Parameter	Method	Station ID	CVOC	ASMW-01	ASMW-02	ASMW-03	ASMW-04	ASMW-05A	ASMW-06	ASMW-07	HPMW-01	HPMW-02	HPMW-04
		Sample ID	MCLs	ASMW-01	ASMW-02	ASMW-03	ASMW-04	ASMW-05A	ASMW-06	ASMW-07	HPMW-01	HPMW-02	HPMW-04
		Date	Units										
<i>Volatile Organic Compounds</i>													
Ethane Dechlorination Series													
1,1,2,2-Tetrachloroethane	SW8260B	µg/L	--	0.8 J	12.4	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
1,1,2-Trichloroethane	SW8260B	µg/L	5	2.5	0.7 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,1-Trichloroethane	SW8260B	µg/L	200	0.7 J	1.1	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloroethane	SW8260B	µg/L	5	0.9 J	0.7 J	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
1,1-Dichloroethane	SW8260B	µg/L	--	104	103	0.2 U	4.8	1.3	0.2	0.5	18.6	2.2	0.2 U
1,1-Dichloroethene	SW8260B	µg/L	7	58.2	89.5	0.3 J	27.7	2.0	0.2 U	0.4	7.8	12.8	0.7 J
Chloroethane	SW8260B	µg/L	--	0.4 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3 U	0.2 U	0.2 U	0.2 U
Methane Dechlorination Series													
Carbon tetrachloride	SW8260B	µg/L	5	0.9 J	1.5	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloroform	SW8260B	µg/L	--	2.0	4.7	0.3 J	1.8	0.5	0.2 U	0.4 U	0.2	0.7 J	0.3 U
Ethene Dechlorination Series													
Trichloroethylene	SW8260B	µg/L	5	1.8	3.3	0.2 U	0.2 U	0.2 U	0.5 U	0.7 U	0.4	1.7	0.6 U
cis-1,2-Dichloroethylene	SW8260B	µg/L	70	0.4 J	2.2	0.2 U	0.2 U	0.2 U	0.3 U	0.5 U	0.4	0.2 U	0.4 U
trans-1,2-Dichloroethylene	SW8260B	µg/L	100	0.2 U	0.3 J	0.2 U	0.2 U	0.2 U	0.4 U	0.6 U	0.2 U	0.2 U	0.5 U
Vinyl chloride	SW8260B	µg/L	2	0.2 U	0.2 J	0.2 U	0.2 U	0.2 U	0.6 U	0.8 U	0.2 U	0.2 U	0.7 U
<i>MNA Constituents</i>													
Nitrate	Calculated	mg/L	--	1.6	0.7	7.2	4.6	13.1	0.1 U	0.6	1 U	41.9	6.6
Nitrite	SM18/4500-NO2 B	mg/L	--	<0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.5 U	0.5 U	0.05 U	0.05 U	0.05 U
Nitrate+Nitrite	SM18/4500-NO3 F	mg/L	--	1.6	0.7	7.2	4.6	13.1	0.1 U	0.6	1 U	41.9	6.6
Ferrous Iron		mg/L	--				0.24				2.42	0.29	0.2
Sulfate	EPA300.0/R2.1	mg/L	--	1140	820	122	26.0	408	115	485	291	1190	65.2
Sulfide	SM18/4500-S2 E	mg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloride	EPA300.0/R2.1	mg/L	--	31.3	61.9	33.2	866	39.6	69.4	41.4	46.3	108	19.1
Ammonia		mg/L	--										
Alkalinity	SM18/2320B	mg/L	--	113	30.6	5 U	84.3	5 U	118	0.5 U	50.8	5 U	32.3
Total Organic Carbon (TOC)	SW9060	mg/L	--	1.7		1.2	1 U	1.2	2.8	1.8	1.6	1.4	2.7
Dissolved Oxygen (DO)	Field Measurement	mV	--	0.43	1.4	0.84	0.8	0.34	0.4	0.6	0.55	466	4.4
Oxidation Reduction Potential	Field Measurement	mg/L	--	171	182	243	172	300	73	248	107	0.7	194
Turbidity	Field Measurement	NTU	--	126	294	129	870	378	13.2	898	116	161	161
pH	Field Measurement	STU	--	5.99	5.35	4.31	6.02	3.7	5.23	4.76	5.79	4.59	5.7
Specific Conductance	Field Measurement	µS/cm	--	2.34	1770	460	2.78	990	680	1,153	0.791	2540	336
<i>Dissolved Gases</i>													
Methane	RSK-175	µg/L	--	1.1	23.6	1.6	0.5 U	46	0.7	0.5 U	32.7	3.2	0.5 U
Ethene	RSK-175	µg/L	--	0.5 U	2.5 U	0.5 U	0.5 U	5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U
Ethane	RSK-175	µg/L	--	0.5 U	2.5 U	0.5 U	0.5 U	5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U
<i>Dioxane</i>													
1,4-Dioxane	SW8260B	µg/L	---	78.2	80.4	72.9	2 U	43.1	2.04	7.50	11.3	2 U	2 U

## Notes:

U - Not detected above the listed reporting limit

J - Estimated value

UJ - Estimated reporting limit

NA - Not analyzed

STU - Standard pH units

Results are validated

Table 2. Historical Summary of Groundwater Sampling Results

Parameter	Method	Station ID	CVOC	ASMW-01R	ASMW-02	ASMW-03	ASMW-03	ASMW-04	ASMW-05A	ASMW-06	ASMW-07	HPMW-01	HPMW-02	HPMW-04
		Sample ID	MCLs	ASMW-01R	ASMW-02	ASMW-03	Duplicate	ASMW-04	ASMW-05A	ASMW-06	ASMW-07	HPMW-01	HPMW-02	HPMW-04
		Date		11/28/2012	11/28/2012	11/28/2012	11/28/2012	11/28/2012	11/28/2012	11/28/2012	11/28/2012	11/28/2012	11/27/2012	11/28/2012
<i>Volatile Organic Compounds</i>														
Ethane Dechlorination Series														
1,1,2,2-Tetrachloroethane	SW8260B	µg/L	--	14.6	10.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	SW8260B	µg/L	5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,1-Trichloroethane	SW8260B	µg/L	200	1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	SW8260B	µg/L	5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	SW8260B	µg/L	--	26.4	93.4	<1.0	<1.0	2.4	<1.0	<1.0	<1.0	15.2	1.1	<1.0
1,1-Dichloroethene	SW8260B	µg/L	7	37.1	73.9	<1.0	<1.0	13.2	1.6	<1.0	<1.0	6	4.7	<1.0
Chloroethane	SW8260B	µg/L	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methane Dechlorination Series														
Carbon tetrachloride	SW8260B	µg/L	5	2.5	1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroform	SW8260B	µg/L	--	5.6	3.7	<1.0	<1.0	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethene Dechlorination Series														
Trichloroethylene	SW8260B	µg/L	5	3.1	3.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.3	<1.0
cis-1,2-Dichloroethylene	SW8260B	µg/L	70	<1.0	1.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-Dichloroethylene	SW8260B	µg/L	100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	SW8260B	µg/L	2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
<i>MNA Constituents</i>														
Nitrate	Calculated	mg/L	--	1.1	0.7	7.4	7.4	4.5	9	<0.1	0.5	<0.1	40.5	3.5
Nitrite	SM18/4500-NO2 B	mg/L	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrate+Nitrite	SM18/4500-NO3 F	mg/L	--	1.1	0.7	7.4	7.4	4.5	9	<0.1	0.5	<0.1	40.5	3.5
Ferrous Iron		mg/L	--	0.52	0.86	0.41	0.41	0.31	1.1	0.48	0.53	0.48	0	0.25
Sulfate	EPA300.0/R2.1	mg/L	--	823	812	146	120	27.9	335	115	416	256	1190	62.2
Sulfide	SM18/4500-S2 E	mg/L	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloride	EPA300.0/R2.1	mg/L	--	40.2	64.6	27.3	30.4	780	33.5	62.9	32.1	44.9	106	20.4
Ammonia		mg/L	--											
Alkalinity	SM18/2320B	mg/L	--	190	7.7	<5.0	<5.0	86.2	<5.0	122	12.4	50.6	<5.0	35
Total Organic Carbon (TOC)	SW9060	mg/L	--	4.2	3.3	1.3*	1.3	1.6*	1.8	4.8	2.5	2.6	4.3 J	1.1
Dissolved Oxygen (DO)	Field Measurement	mV	--	0	0	0	0	4.21	0	0	0	0	571	6.5
Oxidation Reduction Potential	Field Measurement	mg/L	--	141	264	387	387	224	385	125	290	122	2.77	254
Turbidity	Field Measurement	NTU	--	51.7	253	154	154	730	719	0	564	0	1000	16.3
pH	Field Measurement	STU	--	6.49	5.07	4.59	4.59	6.65	4.67	6.19	5.2	5.99	4.27	5.95
Specific Conductance	Field Measurement	µS/cm	--	1.45	1780	407	407	2.67	835	605	0.95	0.643	2980	0.273
<i>Dissolved Gases</i>														
Methane	RSK-175	µg/L	--	11.7	22.2	4.5	5.6	0.5 U	16.9	0.5 U	0.5 U	29.6	5.6	0.5 U
Ethene	RSK-175	µg/L	--	0.5 U	2.5 U	0.5 U	0.5 U							
Ethane	RSK-175	µg/L	--	0.5 U	2.5 U	0.5 U	0.5 U							
<i>Dioxane</i>														
1,4-Dioxane	SW8260B	µg/L	---	48.6	101 J	77.5	82.6 J	<2.0	36.6 J	2.09	4.9	10.9	<2.0	<2.0

## Notes:

U - Not detected above the listed reporting limit

J - Estimated value

UJ - Estimated reporting limit

NA - Not analyzed

STU - Standard pH units

Results are validated

Table 2. Historical Summary of Groundwater Sampling Results

Parameter	Method	Station ID	CVOC	ASMW-01R	ASMW-02	ASMW-03	ASMW-03	ASMW-04	ASMW-05A	ASMW-06	ASMW-07	HPMW-01	HPMW-02	HPMW-04	
		Sample ID	MCLs	ASMW-01R	ASMW-02	ASMW-03	Duplicate	ASMW-04	ASMW-05A	ASMW-06	ASMW-07	HPMW-01	HPMW-02	HPMW-04	
		Date		11/20/2013	11/19/2013	11/19/2013	11/19/2013	11/19/2013	11/19/2013	11/19/2013	11/20/2013	11/19/2013	11/19/2013	11/19/2013	
<i>Volatile Organic Compounds</i>															
Ethane Dechlorination Series															
1,1,2,2-Tetrachloroethane	SW8260B	µg/L	--	14.6	10.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
1,1,2-Trichloroethane	SW8260B	µg/L	5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
1,1,1-Trichloroethane	SW8260B	µg/L	200	1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
1,2-Dichloroethane	SW8260B	µg/L	5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
1,1-Dichloroethane	SW8260B	µg/L	--	26.4	93.4	<1.0	<1.0	4.11	<1.0	<1.0	<1.0	11.8	1.07	<1.0	
1,1-Dichloroethene	SW8260B	µg/L	7	37.1	73.9	<1.0	<1.0	24.7	1.31	<1.0	<1.0	4.48	11	<1.0	
Chloroethane	SW8260B	µg/L	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Methane Dechlorination Series															
Carbon tetrachloride	SW8260B	µg/L	5	2.5	1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Chloroform	SW8260B	µg/L	--	5.6	3.7	<1.0	<1.0	1.77	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Ethene Dechlorination Series															
Trichloroethylene	SW8260B	µg/L	5	3.1	3.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.22	<1.0	
cis-1,2-Dichloroethylene	SW8260B	µg/L	70	0.5	2.21	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
trans-1,2-Dichloroethylene	SW8260B	µg/L	100	0.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Vinyl chloride	SW8260B	µg/L	2	0.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
<i>MNA Constituents</i>															
Nitrate	Calculated	mg/L	--	1.6	0.97	7.34	7.44	4.75	7.91	<0.15	0.65	<0.15	33.9	2.74	
Nitrite	SM18/4500-NO2 B	mg/L	--	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Nitrate+Nitrite	SM18/4500-NO3 F	mg/L	--	1.6	0.97	7.34	7.44	4.75	7.91	<0.1	0.65	0.1	33.9	2.74	
Ferrous Iron		mg/L	--	0.07	1.65	0.28	0.28	0.02	0.23	0.68	0	1.23	0	0.12	
Sulfate	EPA300.0/R2.1	mg/L	--	1340	756	137	120	23.9	268	108	477	234	287	54.2	
Sulfide	SM18/4500-S2 E	mg/L	--	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Chloride	EPA300.0/R2.1	mg/L	--	29.4	47.4	22.8	24.4	705	30.3	62.9	34.2	37.9	62.4	21.5	
Ammonia		mg/L	--	NA	0	0	0	0	0	0	0	0	0	0	
Alkalinity	SM18/2320B	mg/L	--	86.6	5.4	<5.0	<5.0	83	<5.0	136	13.1	63	<5.0	35.6	
Total Organic Carbon (TOC)	SW9060	mg/L	--	1.9	2.5	<1.0	<1.0	3.5	1.4	4.2	2	2.3	1.9 J	<1.0	
Dissolved Oxygen (DO)	Field Measurement	mV	--	2.61	0.77	0.51	0.51	0.76	0.32	0.29	0.45	0.38	753	5.38	
Oxidation Reduction Potential	Field Measurement	mg/L	--	144	452	608	608	450	591	305	504	337	0.38	447	
Turbidity	Field Measurement	NTU	--	431	5999	151	151	193	1264	314	2000	232	2000	422	
pH	Field Measurement	STU	--	5.98	4.98	4.65	4.65	6.01	4.61	6.06	5.09	5.86	5.13	5.83	
Specific Conductance	Field Measurement	µS/cm	--	2460	1.78	0.443	0.44	2.65	0.807	0.732	1.15	0.707	1.083	0.301	
<i>Dissolved Gases</i>															
Methane	RSK-175	µg/L	--	0.8	J	17.3	J	2.6	J	0.5 UJ	115	J	1.2	J	
Ethene	RSK-175	µg/L	--	0.5	UJ	0.5	UJ								
Ethane	RSK-175	µg/L	--	0.5	UJ	0.5	UJ								
<i>Dioxane</i>															
1,4-Dioxane	SW8260B	µg/L	---	87.7	J	111	J	56.7	J	62.1	J	<2.0	26.2	J	

## Notes:

U - Not detected above the listed reporting limit

J - Estimated value

UJ - Estimated reporting limit

NA - Not analyzed

STU - Standard pH units

Results are validated

Table 2. Historical Summary of Groundwater Sampling Results

Parameter	Method	Station ID	CVOC	ASMW-01R	ASMW-02	ASMW-03	ASMW-03	ASMW-04	ASMW-05A	ASMW-06	ASMW-07	HPMW-01	HPMW-02	HPMW-04
		Sample ID	MCLs	ASMW-01R	ASMW-02	ASMW-03	Duplicate	ASMW-04	ASMW-05A	ASMW-06	ASMW-07	HPMW-01	HPMW-02	HPMW-04
		Date		11/13/2014	11/13/2014	11/13/2014	11/13/2014	11/13/2014	11/13/2014	11/13/2014	11/13/2014	11/12/2014	11/12/2014	11/12/2014
<i>Volatile Organic Compounds</i>														
Ethane Dechlorination Series														
1,1,2,2-Tetrachloroethane	SW8260B	µg/L	--	21.7	18.1	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.0	<1.00	<1.00
1,1,2-Trichloroethane	SW8260B	µg/L	5	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.0	<1.00	<1.00
1,1,1-Trichloroethane	SW8260B	µg/L	200	3.9	2.13	<1.00	<1.00	2.78	<1.00	<1.00	<1.00	<1.0	<1.00	<1.00
1,2-Dichloroethane	SW8260B	µg/L	5	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.0	<1.00	<1.00
1,1-Dichloroethane	SW8260B	µg/L	--	63.4	109	<1.00	<1.00	10.4	<1.00	<1.00	<1.00	11.1	1.46	<1.00
1,1-Dichloroethene	SW8260B	µg/L	7	104	111	<1.00	<1.00	50.6	1.24	<1.00	<1.00	3.47	11.2	2.44
Chloroethane	SW8260B	µg/L	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.0	<1.00	<1.00
<i>Methane Dechlorination Series</i>														
Carbon tetrachloride	SW8260B	µg/L	5	4.25	3.33	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.0	<1.00	<1.00
Chloroform	SW8260B	µg/L	--	8.1 U	6.82 U	<1.00	<1.00	4.55 U	<1.00	<1.00	<1.00	<1.0	<1.00	<1.00
<i>Ethene Dechlorination Series</i>														
Trichloroethylene	SW8260B	µg/L	5	4.61	4.1	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.0	3.94	<1.00
cis-1,2-Dichloroethylene	SW8260B	µg/L	70	1.35	1.86	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.0	<1.00	<1.00
trans-1,2-Dichloroethylene	SW8260B	µg/L	100	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.0	<1.00	<1.00
Vinyl chloride	SW8260B	µg/L	2	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.0	<1.00	<1.00
<i>MNA Constituents</i>														
Nitrate	Calculated	mg/L	--	1.34	1.51	10.2	9.19	6	12.9	<0.15	1.01	0.48	78.1	6.86
Nitrite	SM18/4500-NO2 B	mg/L	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrate+Nitrite	SM18/4500-NO3 F	mg/L	--	1.34	1.51	10.2	9.19	6	12.9	<0.10	1.01	0.48	78.1	6.86
Ferrous Iron		mg/L	--	0	0.13	1.08	1.08	0.37	0.23	0.17	0	1.3	0.2	0.34
Sulfate	EPA300.0/R2.1	mg/L	--	742	813	140	119	342	302	112	488	207	376	53.2
Sulfide	SM18/4500-S2 E	mg/L	--	<1.0	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.0	<1.00	<1.00
Chloride	EPA300.0/R2.1	mg/L	--	36.5	59.5	26.5	24	78	32	65	46.6	39.9	70.1	24.6
Ammonia		mg/L	--											
Alkalinity	SM18/2320B	mg/L	--	168	<5.0	<5.0	<5.0	60.5	<5.0	111	44.4	49.2	21.1	41.2
Total Organic Carbon (TOC)	SW9060	mg/L	--	2.4	2	<1.0	<1.0	1.4	1.2	4.2	1.8	2.8	1.6	<1.0
Dissolved Oxygen (DO)	Field Measurement	mV	--	0	0.59	2.47	0.51	0.84	0	2.12	0	0.68	672	4.11
Oxidation Reduction Potential	Field Measurement	mg/L	--	180	233	290	608	220	430	237	310	134	0.83	2.35
Turbidity	Field Measurement	NTU	--	417	321	159	151	520	525	87.5	729	117	628	197
pH	Field Measurement	STU	--	6.32	4.81	4.3	4.65	5.82	4.14	5.92	5.45	5.57	5.23	5.65
Specific Conductance	Field Measurement	µS/cm	--	1.02	1.55	0.417	0.44	0.988	0.668	0.524	1	0.7	1.325	0.34
<i>Dissolved Gases</i>														
Methane	RSK-175	µg/L	--	7.6	7.2	1.3 J	2.2 J	<0.5	63.1	<0.5	0.6	6.8	<0.5	<0.5
Ethene	RSK-175	µg/L	--	<0.5	<0.5	<0.5	0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
Ethane	RSK-175	µg/L	--	<0.5	<0.5	<0.5	0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
<i>Dioxane</i>														
1,4-Dioxane	SW8260B	µg/L	---	90.3 J	121	58.5 J	62.1	<2.0	36.4	2.83 J	3.37 J	9.28	<2.0	<2.00

## Notes:

U - Not detected above the listed reporting limit

J - Estimated value

UJ - Estimated reporting limit

NA - Not analyzed

STU - Standard pH units

Results are validated

Table 2. Historical Summary of Groundwater Sampling Results

Parameter	Method	Station ID	CVOC	ASMW-01R	ASMW-02	ASMW-03	ASMW-03	Duplicate	ASMW-04	ASMW-05A	ASMW-06	ASMW-07	HPMW-01	HPMW-02	HPMW-04
		Sample ID	MCLs	ASMW-01R	ASMW-02	ASMW-03	ASMW-03		ASMW-04	ASMW-05A	ASMW-06	ASMW-07	HPMW-01	HPMW-02	HPMW-04
		Date		11/4/2015	11/4/2015	11/4/2015	11/4/2015	11/3/2015	11/4/2015	11/3/2015	11/4/2015	11/3/2015	11/3/2015	11/3/2015	11/2/2015
<i>Volatile Organic Compounds</i>															
Ethane Dechlorination Series															
1,1,2,2-Tetrachloroethane	SW8260B	µg/L	--	16.4	15.7	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
1,1,2-Trichloroethane	SW8260B	µg/L	5	<1.00	0.61	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
1,1,1-Trichloroethane	SW8260B	µg/L	200	2.75	1.45	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
1,2-Dichloroethane	SW8260B	µg/L	5	<1.00	0.99	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
1,1-Dichloroethane	SW8260B	µg/L	--	55.4	72.2	<1.00	<1.00	1.45	0.49	1	1.4	8.43	0.63	<1.00	
1,1-Dichloroethene	SW8260B	µg/L	7	80.1	77.4	<1.00	<1.00	3.48	0.59	0.32	0.69	2.66	7	0.49	
Chloroethane	SW8260B	µg/L	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Methane Dechlorination Series															
Carbon tetrachloride	SW8260B	µg/L	5	2.8	1.66	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Chloroform	SW8260B	µg/L	--	6.45	5.28	<0.50	<0.50	0.78	<0.50	<0.50	<0.50	<0.50	0.48	<0.50	
Ethene Dechlorination Series															
Trichloroethylene	SW8260B	µg/L	5	3.24	3.02	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	0.75	2.1	<1.00	
cis-1,2-Dichloroethylene	SW8260B	µg/L	70	1.27	1.56	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
trans-1,2-Dichloroethylene	SW8260B	µg/L	100	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Vinyl chloride	SW8260B	µg/L	2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
<i>MNA Constituents</i>															
Nitrate	Calculated	mg/L	--	1.74	1.94	10.2	9.92	5.65	13.6	1.12	0.18	1.37	33.8	2.11	
Nitrite	SM18/4500-NO2 B	mg/L	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrate+Nitrite	SM18/4500-NO3 F	mg/L	--	1.74	1.94	10.2	9.92	5.65	13.6	1.12	0.18	1.37	33.8	2.11	
Ferrous Iron		mg/L	--	0.49	0.71	0.58	0	0	0.19	0.1	2.87	2.13	0.09	0.3	
Sulfate	EPA300.0/R2.1	mg/L	--	542	728	122	119	44	240	133	508	289	218	53	
Sulfide	SM18/4500-S2 E	mg/L	--	<1.0	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Chloride	EPA300.0/R2.1	mg/L	--	38.6	48.7	25.1	23.8	13.4	35.4	80.6	66.6	58.8	74.4	27.8	
Ammonia		mg/L	--												
Alkalinity	SM18/2320B	mg/L	--	43	<5.0	<5.0	<5.0	90	<5.0	129	<5.0	65	21	49	
Total Organic Carbon (TOC)	SW9060	mg/L	--	2.3	2	1.2	1.8	5.2	1.2	4.5	2.2	3.5	1.6	1.1	
Dissolved Oxygen (DO)	Field Measurement	mV	--	53.3	3.76	94.1	94.1	6.36	7.4	7.07	18	4.9	0	8.43	
Oxidation Reduction Potential	Field Measurement	mg/L	--	215.7	257	282.8	282.8	287	352	31	267.2	145.3	0.544	237	
Turbidity	Field Measurement	NTU	--	74.3	0	0.5	0.5	206	0	0	889.2	103.9	0	0	
pH	Field Measurement	STU	--	5.41	6.22	5.06	5.06	7.29	5.11	7.58	5.11	5.68	5.33	6.39	
Specific Conductance	Field Measurement	µS/cm	--	1.228	0	4	4	0	0	0	1.394	774	0.473	0.294	
<i>Dissolved Gases</i>															
Methane	RSK-175	µg/L	--	4.78	4.78	<0.5	<0.5	<0.5	<5.0	<0.5	0.82	1.55	<0.5	NA	
Ethene	RSK-175	µg/L	--	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	NA	
Ethane	RSK-175	µg/L	--	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	NA	
<i>Dioxane</i>															
1,4-Dioxane	SW8260B	µg/L	---	67.6	91.4	63.4	51.5	<2.0	27.8	4.91	3.56	5.91	<2.0	<2.0	

## Notes:

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STU - Standard pH units

Results are validated

Table 2. Historical Summary of Groundwater Sampling Results

Parameter	Method	Station ID	CVOC	ASMW-01R	ASMW-02	ASMW-03	ASMW-03	ASMW-04	ASMW-05A	ASMW-06	ASMW-07	HPMW-01	HPMW-02	HPMW-04
		Sample ID	MCLs	ASMW-01R	ASMW-02	ASMW-03	Duplicate	ASMW-04	ASMW-05A	ASMW-06	ASMW-07	HPMW-01	HPMW-02	HPMW-04
		Date	Units	11/8/2016	11/9/2016	11/8/2016	11/8/2016	11/8/2016	11/8/2016	11/9/2016	11/9/2016	11/7/2016	11/7/2016	11/7/2016
<i>Volatile Organic Compounds</i>														
Ethane Dechlorination Series														
1,1,2,2-Tetrachloroethane	SW8260B	µg/L	--	20.3	14.5	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
1,1,2-Trichloroethane	SW8260B	µg/L	5	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
1,1,1-Trichloroethane	SW8260B	µg/L	200	4.1	1.35	<1.00	<1.00	1.11	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
1,2-Dichloroethane	SW8260B	µg/L	5	<1.00	1.12	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
1,1-Dichloroethane	SW8260B	µg/L	--	61.1	75.5	<1.00	<1.00	9.85	<1.00	1.06	2.9	13.4	<1.00	<1.00
1,1-Dichloroethene	SW8260B	µg/L	7	93.6	81	<1.00	<1.00	47.8	<1.00	<1.00	1.29	4.43	5.51	<1.00
Chloroethane	SW8260B	µg/L	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
<i>Methane Dechlorination Series</i>														
Carbon tetrachloride	SW8260B	µg/L	5	4.33	1.61	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Chloroform	SW8260B	µg/L	--	7.7	5.97	<0.50	<0.50	3.84	<0.50	<0.50	<0.50	<0.50	0.76	<0.50
<i>Ethene Dechlorination Series</i>														
Trichloroethylene	SW8260B	µg/L	5	4	3.3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	2.26	<1.00
cis-1,2-Dichloroethylene	SW8260B	µg/L	70	1.57	1.71	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
trans-1,2-Dichloroethylene	SW8260B	µg/L	100	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Vinyl chloride	SW8260B	µg/L	2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
<i>MNA Constituents</i>														
Nitrate	Calculated	mg/L	--	2.08	2.1	7.87	9.92	4.98	14.3	<0.15	0.86	0.7	22	1
Nitrite	SM18/4500-NO2 B	mg/L	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrate+Nitrite	SM18/4500-NO3 F	mg/L	--	2.08	2.1	7.87	9.92	4.98	14.3	<0.10	0.86	0.7	22	1
Ferrous Iron		mg/L	--	0.65	0.9	0	0	0.04	0	0.54	0	1.26	0.1	
Sulfate	EPA300.0/R2.1	mg/L	--	475	659	111	119	149	364	121	471	221	147	44.2
Sulfide	SM18/4500-S2 E	mg/L	--	<1.0	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Chloride	EPA300.0/R2.1	mg/L	--	34.4	41.7	20.8	23.8	545	33.6	75.1	66.3	47.2	57.9	23.9
Ammonia		mg/L	--											3.3
Alkalinity	SM18/2320B	mg/L	--	54	<5.0	<5.0	<5.0	<5.0	92	<5.0	135	30	76	39
Total Organic Carbon (TOC)	SW9060	mg/L	--	1.6	2.9	<1.0	1.8	3.2	1.1	4.5	2.5	6	3	1.1
Dissolved Oxygen (DO)	Field Measurement	mV	--	0.21	2.02	0.69	0.69	0.14	0.43	8.75	6	3.2	1.24	4.01
Oxidation Reduction Potential	Field Measurement	mg/L	--	177.6	252	271.3	271.3	160.4	271	168.8	265	120	472	177
Turbidity	Field Measurement	NTU	--	55.8	0	61.3	61.3	164	166	67.8	807	390	66	178
pH	Field Measurement	STU	--	5.51	6.16	4.57	4.57	6.09	4.59	6.98	5.21	5.95	5.6	5.93
Specific Conductance	Field Measurement	µS/cm	--	1.166	0.15	0.41	0.41	2.76	1.01	0.741	1.462	0.768	838	0.28
<i>Dissolved Gases</i>														
Methane	RSK-175	µg/L	--	9.17	3.29	3.05	<0.5	<0.5	9.64	<0.5	0.59	3.66	<0.5	0.53
Ethene	RSK-175	µg/L	--	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
Ethane	RSK-175	µg/L	--	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
<i>Dioxane</i>														
1,4-Dioxane	SW8260B	µg/L	---	70.4	94.3	56.1	51.5	<2.0	30.3	3.07	4.55	8.09	<2.0	<2.00

## Notes:

U - Not detected above the listed reporting limit

J - Estimated value

UJ - Estimated reporting limit

NA - Not analyzed

STU - Standard pH units

Results are validated

Table 2. Historical Summary of Groundwater Sampling Results

Parameter	Method	Station ID	CVOC	ASMW-01R	ASMW-01R	ASMW-02	ASMW-04
		Sample ID	MCLs	ASMW-01R	DUP-1	ASMW-02	ASMW-04
		Date		11/9/2017	11/9/2017	11/9/2017	11/9/2017
<i>Volatile Organic Compounds</i>							
Ethane Dechlorination Series							
1,1,2,2-Tetrachloroethane	SW8260B	µg/L	--	22.4	21.9	10.7	<0.4
1,1,2-Trichloroethane	SW8260B	µg/L	<b>5</b>	<1.00	<1.00	<1.00	<1.00
1,1,1-Trichloroethane	SW8260B	µg/L	<b>200</b>	3.58	3.25	1.06	1.06
1,2-Dichloroethane	SW8260B	µg/L	<b>5</b>	<1.00	1	<1.00	<1.00
1,1-Dichloroethane	SW8260B	µg/L	--	74.4	68.8	74.6	11.6
1,1-Dichloroethene	SW8260B	µg/L	<b>7</b>	<b>115</b>	<b>107</b>	<b>81</b>	<b>56.1</b>
Chloroethane	SW8260B	µg/L	--	<1.00	<1.00	<1.00	<1.00
Methane Dechlorination Series							
Carbon tetrachloride	SW8260B	µg/L	<b>5</b>	<b>5.38</b>	4.8	1.44	<1.00
Chloroform	SW8260B	µg/L	--	9.43	8.9	5.57	4.26
Ethene Dechlorination Series							
Trichloroethylene	SW8260B	µg/L	<b>5</b>	<b>5.62</b>	<b>5.15</b>	2.86	<1.00
cis-1,2-Dichloroethylene	SW8260B	µg/L	<b>70</b>	1.47	1	1.4	<1.00
trans-1,2-Dichloroethylene	SW8260B	µg/L	<b>100</b>	<1.00	1.47	<1.00	<1.00
Vinyl chloride	SW8260B	µg/L	<b>2</b>	<0.5	<0.5	<0.5	<0.5
<i>MNA Constituents</i>							
Nitrate	Calculated	mg/L	--	2.22	2.1	2.19	4.8
Nitrite	SM18/4500-NO2 B	mg/L	--	<0.05	<0.05	<0.05	<0.05
Nitrate+Nitrite	SM18/4500-NO3 F	mg/L	--	2.22	2.1	2.19	4.8
Ferrous Iron		mg/L	--	0	0	0.02	0.09
Sulfate	EPA300.0/R2.1	mg/L	--	424	421	614	161
Sulfide	SM18/4500-S2 E	mg/L	--	<1.00	<1.00	<1.00	<1.00
Chloride	EPA300.0/R2.1	mg/L	--	39.8	34.7	44.9	520
Ammonia		mg/L	--	NA	NA	NA	NA
Alkalinity	SM18/2320B	mg/L	--	29	13	8	99
Total Organic Carbon (TOC)	SW9060	mg/L	--	2.4	2.4	2.2	2.6
Dissolved Oxygen (DO)	Field Measurement	mV	--	1.01	1.01	1.43	1.22
Oxidation Reduction Potential	Field Measurement	mg/L	--	220	220	203.6	149.3
Turbidity	Field Measurement	NTU	--	6.9	6.9	538	64
pH	Field Measurement	STU	--	5.36	5.36	5.17	6.06
Specific Conductance	Field Measurement	µS/cm	--	956	956	1180	176.1
<i>Dissolved Gases</i>							
Methane	RSK-175	µg/L	--	15.8	14.1	10.4	<5 U
Ethene	RSK-175	µg/L	--	<5 U	<5	<5 U	<5 U
Ethane	RSK-175	µg/L	--	<5 U	<5	<5 U	<5 U
<i>Dioxane</i>							
1,4-Dioxane	SW8260B	µg/L	---	NA	NA	NA	NA

## Notes:

U - Not detected above the listed reporting limit

J - Estimated value

UJ - Estimated reporting limit

NA - Not analyzed

STU - Standard pH units

Results are validated



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## MEMORANDUM

---

TO: Charles Thibault, EarthCon Consultants, Inc.  
FROM: Kathy J. Gunderson, Senior Scientist  
DATE: November 28, 2017  
SUBJECT: Quality Assurance Review  
PROJECT: Long-term Groundwater Monitored Program, Former Firestone Fibers and Textiles Plant, Hopewell, Virginia  
RE: November 2017 Monitoring Event  
Project #: 02.20980007.00-5

---

### 1.0 Introduction

This memorandum presents the cursory validation of the sample analyses listed in Table 1. Three samples, one field blank, one rinse blank, one trip blank, and one field duplicate were collected November 6 and 7, 2017. The analyses were performed by Air, Water, and Soil Laboratories, Inc. (AW&S), located in Richmond, Virginia.

The criteria used to qualify data are from the *Contract Laboratory Program National Functional Guidelines for Organic and Inorganic Data Review* (USEPA 1999 and 1994), the analytical methods, or the professional judgment of the validation chemist. The following laboratory deliverables were reviewed during the validation process:

- Chain-of-custody (COC) documentation to assess holding times and verify report completeness
- Laboratory quality control (QC) sample results, including method blanks, surrogate spikes, laboratory control sample/laboratory control sample duplicates (LCS/LCSDs), matrix spike/matrix spike duplicates (MS/MSDs), and laboratory duplicates
- Analytical results to verify reporting limits
- Field QC samples to assess field blank contamination and field duplicate precision

Field duplicate precision is presented in Table 2 and the qualified data are summarized in Table 3 at the end of this memorandum.

**Table 1—Sample Data Reviewed**

Field Sample ID	AW&S Sample ID	VOCs	Water Quality Parameters	Dissolved Gases
ASMW-01R	17K0149-01	X	X	X
ASMW-02	17K0149-02	X	X	X
ASMW-04	17K0149-03	X	X	X
DUP-1	17K0149-04	X	X	X
Rinsate	17K0149-05		*	
Field Blank	17K0149-06		*	
Trip Blank	17K0149-07	X		X

VOCs – Volatile organic compounds by Method 8260B (USEPA 1996)

Water quality parameters – alkalinity by Method 2320B (APHA 1998), chloride and sulfate by Method 300.0 (USEPA 1999a), nitrate plus nitrite by Method 4500 (APHA 1998), sulfide by Method 9034 (USEPA 1996), and total organic carbon (TOC) by Method 9060 (USEPA 1996)

Dissolved gas analyses – methane, ethane, and ethylene by Method RSK-175 (USEPA 2004)

\* Nitrate plus nitrite by Method 4500 (APHA 1998) and TOC by Method 9060 (USEPA 1996)

## 2.0 Data Validation Findings

### 2.1 Custody, Preservation, and Completeness – Acceptable with Discussion

Sample custody was maintained as required from sample collection to receipt at the laboratory. The samples were received intact and were properly preserved. Except as noted below, the report is complete and contains results for the samples and tests requested on the COC forms.

- The trip blank and field blank were marked for VOC analysis. Neither sample was analyzed for VOCs.
- The trip blank was analyzed for dissolved gases even though dissolved gases were not requested on the COC.
- Only sulfuric acid preserved aliquots were submitted to the laboratory for the Rinsate and Field Blank. As a result, these samples were analyzed for nitrate plus nitrite and TOC.

### 2.2 Volatile Organic Compound Analyses

The samples were analyzed for VOCs by GC/MS via Method 8260B.

### **2.2.1 Holding Times – Acceptable**

The samples were analyzed within the method specified holding time of 14 days from collection for preserved water samples.

### **2.2.2 Blank Analyses – Acceptable**

#### **2.2.2.1 Method Blanks**

Method blanks were analyzed at the required frequency and VOCs were not detected above the reporting limits.

#### **2.2.2.2 Trip Blanks**

One trip blank is associated with the samples. VOCs were not detected above the reporting limits in the trip blank.

### **2.2.3 Surrogate Analyses – Acceptable**

Surrogate compounds were added to the samples, blanks, and QC samples as required by the Method. The recovery values are within the laboratory control limits.

### **2.2.4 Laboratory Control Sample Analyses – Acceptable**

The laboratory analyzed LCSs at the required frequency of one per batch. The LCS results are within the laboratory control limits for recovery.

### **2.2.5 Matrix Spike/Matrix Spike Duplicate Analyses – Acceptable with Discussion**

MS/MSD analyses were performed at the required frequency. The recovery and relative percent difference (RPD) values are within the laboratory control limits, with the following exceptions.

- The 2-butanone RPD value in the spiked analysis of sample ASMW-01R is above the laboratory control limit of less than 30 at 110. Data qualifiers are not required because 2-butanone was not detected in sample ASMW-01R.
- The 1,1-dichloroethene MS recovery value in the spiked analysis of sample ASMW-01R is below the laboratory control limits of 70 to 130 percent at 65.7 percent. Data qualifiers are not required because the MSD recovery value is acceptable at 72.9 percent.

### **2.2.6 Laboratory Reporting Limits – Acceptable**

The project specific target compounds were reported. The historical reporting limits were met.

### **2.2.7 Field Duplicates – Acceptable**

One field duplicate was collected with the samples. Sample DUP-1 is a field duplicate of sample ASMW-01R. Field duplicate precision is acceptable as shown by the low RPD values listed in Table 2.

### **2.2.8 Overall Assessment of Data Usability**

The usability of the data is based on the EPA guidance documents noted previously. Upon consideration of the information presented here, the data are acceptable.

## **2.3 Dissolved Gas Analyses**

The samples were analyzed for dissolved methane, ethane, and ethylene by gas chromatography via Method RSK-175.

### **2.3.1 Holding Times – Acceptable**

The samples were analyzed within the method-required holding time of 14 days from collection.

### **2.3.2 Blank Analyses – Acceptable**

#### **2.3.2.1 Method Blanks**

Method blanks were analyzed at the required frequency of one per batch. Dissolved gases were not detected above the reporting limits.

#### **2.3.2.2 Trip Blanks**

The Trip Blank is free of dissolved gases.

### **2.3.3 Surrogate Analyses**

Surrogate compounds were added to the samples, blanks, and QC samples. The recovery values are within the laboratory control limits of 70 to 130 percent.

### **2.3.1 Laboratory Control Sample Analyses – Acceptable**

LCS/LCSDs were analyzed at the required frequency of one per analytical batch. The recovery and RPD values are within the laboratory control limits.

### **2.3.2 Matrix Spike/Matrix Spike Duplicate Analyses – Acceptable**

MS/MSD analyses were performed at the required frequency and the recovery and RPD values are within the laboratory control limits.

### **2.3.3 Laboratory Reporting Limits – Acceptable**

Target detection limits were not specified for dissolved gas analyses. The reporting limits reported are reasonable for the analytical method.

### **2.3.4 Field Duplicates – Acceptable**

One field duplicate was collected with the samples. Sample DUP-1 is a field duplicate of sample ASMW-01R. RPD values less than 35 are considered acceptable precision for water samples. The methane RPD value is acceptable as shown in Table 2.

### **2.3.5 Overall Assessment of Data Usability**

The usability of the data is based on the EPA guidance documents noted previously. Upon consideration of the information presented here, the data are acceptable.

## **2.4 Water Quality Parameters Analyses**

The samples were analyzed for chloride and sulfate by ion chromatography via Method 300.0, alkalinity and sulfide by titration via Methods 2320B and 9215, nitrite and nitrate plus nitrite by colorimetry via Method 4500-NO<sub>2</sub> and NO<sub>3</sub>, nitrate by calculation, and TOC by carbonaceous analyzer via Method 9060A.

### **2.4.1 Holding Times – Acceptable**

The samples were analyzed within the method-required holding times of 48 hours for nitrite, 7 days for sulfide, 14 days for alkalinity, and 28 days for chloride, nitrate plus nitrite, sulfate, and TOC.

#### **2.4.1.1 Method Blanks**

Method blanks were analyzed at the required frequency of one per analytical batch. Target constituents were not detected in the method blanks.

#### **2.4.1.2 Field Blanks**

The rinsate and field blanks are free of nitrate plus nitrite and TOC.

### **2.4.2 Laboratory Control Sample Analyses – Acceptable**

LCSs or LCS/LCSDs were analyzed at the required frequency of one per batch. The recovery and RPD values are within the laboratory control limits.

### **2.4.3 Spiked Sample Analyses – Acceptable with Discussion**

MS/MSD analyses were performed at the required frequency of one per analytical batch. The recovery values are within the laboratory control limits, with the following exceptions.

- Two nitrate plus nitrite MS/MSDs are associated with the samples. In both cases, the MS or MS and MSD recovery values are above the laboratory control limits. Non-project samples were utilized as the MS/MSDs; data qualifiers are not required.

- The sulfate MSD recovery value in the spiked analysis of sample ASMW-01R is above the laboratory control limits of 90 to 110 percent at 113 percent. Data quality is not affected and data qualifiers are not required because the MS recovery value is acceptable at 109 percent.

#### **2.4.4 Laboratory Duplicate Sample Analysis – Acceptable**

The laboratory analyzed MSDs and duplicates to satisfy the duplicate requirement of the methods. The RPD values are within the laboratory control limits.

#### **2.4.5 Laboratory Reporting Limits – Acceptable with Discussion**

The project specific target constituents were reported as required. With two exceptions, the historical reporting limits were met.

- The chloride reporting limit is 10 mg/L, which is greater than the historical reporting limit of 1 mg/L.
- The nitrate reporting limit is 0.15 mg/L, which is greater than the historical reporting limit of 0.10 mg/L.

#### **2.4.6 Field Duplicates – Acceptable with Qualification**

One field duplicate was collected with the samples. Sample DUP-1 is a field duplicate of sample ASMW-01R. Field duplicate RPD values less than or equal to 35 are considered acceptable precision. With one exception, field duplicate precision is acceptable as shown in Table 2.

- The alkalinity RPD value is above criteria at 76.2 percent. The alkalinity results of both samples are qualified as estimated (J) as shown below and in Table 3.

Sample ID	Analyte	Qualifier	Quality Control Exceedance
ASMW-01R	Alkalinity	J	Field duplicate RPD greater than 35
DUP-1	Alkalinity	J	Field duplicate RPD greater than 35

#### **2.4.7 Overall Assessment of Data Usability**

The usability of the data is based on the EPA guidance documents noted previously. Upon consideration of the information presented here, the data are acceptable. The data qualifier flags modify the usefulness of the individual values.

## 3.0 Data Qualifier Definitions

### 3.1 Organic Data Qualifiers

The following data validation qualifiers were used in the review of this data set. These qualifiers are from the *Contract Laboratory Program National Functional Guidelines for Organic Data Review*.

- U The analyte was analyzed for but not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a “tentative identification”.
- NJ The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents its approximate concentration.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the samples and meet quality control criteria. The presence or absence of the analyte cannot be verified.

### 3.2 Inorganic Data Qualifiers

The following data validation qualifiers were used in the review of this data set. These qualifiers are from the *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*.

- U The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
- J The associated value is an estimated quantity.
- UJ The material was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
- R The data are unusable. (Note: Analyte may or may not be present.)

## 4.0 References

- APHA. 1998. Standard Methods for the Examination of Water and Wastewater, 20<sup>th</sup> Edition. American Public Health Association. 1998.
- USEPA. 1994. Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. United States Environmental Protection Agency. Office of Solid Waste and Emergency Response. February 1994.
- USEPA. 1996. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846) Third Edition, Updates I, II, IIA, IIB, and III. United States Environmental Protection Agency. Office of Solid Waste. December 1996.
- USEPA. 1999. Contract Laboratory Program National Functional Guidelines for Organic Data Review. U.S. Environmental Protection Agency Office of Emergency and Remedial Response. EPA540/R-99/008. October 1999.
- USEPA. 1999a. Methods and Guidance for Analysis of Water, Version 2.0. United States Environmental Protection Agency Office of Science and Technology. EPA 821-C-99-004. CD ROM. June 1999.
- USEPA 2004. Sample Preparation and Calculations for Dissolved Gas Analysis in Water Samples using a GC Headspace Equilibration Technique, RSKSOP-175, Revision 2, U.S. Environmental Protection Agency, Groundwater and Ecosystems Restoration Division. May 2004.

**Table 2—Field Duplicate Precision**

Parameter	Units	ASMW-01R Result	Dup-1 Result	RPD
Nitrate as N	mg/L	2.22	2.1	5.6
Chloride	mg/L	39.8	34.7	13.7
Sulfate	mg/L	424	421	0.7
Methane	ug/L	15.8	14.1	11.4
Alkalinity	mg/L	29	13	<b>76.2</b>
Nitrate+Nitrite as N	mg/L	2.22	2.1	5.6
1,1,1-Trichloroethane	ug/L	3.58	3.25	9.7
1,1,2,2-Tetrachloroethane	ug/L	22.4	21.9	2.3
1,1-Dichloroethane	ug/L	74.4	68.8	7.8
1,1-Dichloroethylene	ug/L	115	107	7.2
1,3-Dichloropropane	ug/L	1.15	< 1.00	NC
Carbon tetrachloride	ug/L	5.38	4.8	11.4
Chloroform	ug/L	9.43	8.9	5.8
cis-1,2-Dichloroethylene	ug/L	1.47	1.47	0.0
Trichloroethylene	ug/L	5.62	5.15	8.7
TOC (Max)	mg/L	2.4	2.4	0.0
TOC (Mean)	mg/L	2.4	2.3	4.3
TOC (Min)	mg/L	2.3	2.2	4.4

RPD – Relative percent difference

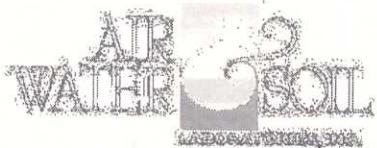
< -- Undetected at the listed reporting limit

NC – Not calculatable

Bold values exceed the project criteria of 35

**Table 3—Summary of Qualified Data**

Sample ID	Analyte	Qualifier	Quality Control Exceedance
ASMW-01R	Alkalinity	J	Field duplicate RPD greater than 35
DUP-1	Alkalinity	J	Field duplicate RPD greater than 35



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## Certificate of Analysis

### Final Report

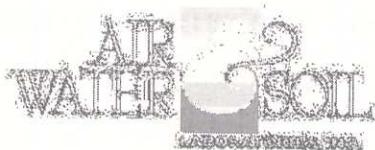
Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results		Laboratory Sample ID: 17K0149-01						
Sample I.D.	ASMW-01R							
Grab Date/Time:	11/06/2017 13:00							
Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time
<b>Volatile Organic Compounds by GCMS</b>								
1,1,1,2-Tetrachloroethane	01	SW8260B	<0.40 ug/L		0.40	1	11/07/17 14:30	11/07/17 14:30
1,1,1-Trichloroethane	01	SW8260B	3.58 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
1,1,2,2-Tetrachloroethane	01	SW8260B	22.4 ug/L		0.40	1	11/07/17 14:30	11/07/17 14:30
1,1,2-Trichloroethane	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
1,1-Dichloroethane	01	SW8260B	74.4 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
1,1-Dichloroethylene	01	SW8260B	115 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
1,1-Dichloropropene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
1,2,3-Trichlorobenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
1,2,3-Trichloropropane	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
1,2,4-Trichlorobenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
1,2,4-Trimethylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
1,2-Dibromo-3-chloropropane (DBCP)	01	SW8260B	<4.00 ug/L		4.00	1	11/07/17 14:30	11/07/17 14:30
1,2-Dibromoethane (EDB)	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
1,2-Dichlorobenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
1,2-Dichloroethane	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
1,2-Dichloropropane	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
1,3,5-Trimethylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
1,3-Dichlorobenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
1,3-Dichloropropane	01	SW8260B	1.15 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
1,4-Dichlorobenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
2,2-Dichloropropane	01	SW8260B	<2.00 ug/L		2.00	1	11/07/17 14:30	11/07/17 14:30
2-Butanone (MEK)	01	SW8260B	<10.0 ug/L		10.0	1	11/07/17 14:30	11/07/17 14:30
2-Chlorotoluene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
2-Hexanone (MBK)	01	SW8260B	<5.00 ug/L		5.00	1	11/07/17 14:30	11/07/17 14:30
4-Chlorotoluene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
4-Isopropyltoluene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30

kgp112217



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## Certificate of Analysis

### Final Report

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

---

#### Analytical Results

---

Sample I.D. ASMW-01R Laboratory Sample ID: 17K0149-01

Grab Date/Time: 11/06/2017 13:00

---

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
-----------	---------	--------	--------	------	-----------------	------	-----------------------	--------------------	---------

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#### Volatile Organic Compounds by GCMS

4-Methyl-2-pentanone (MIBK)	01	SW8260B	<5.00 ug/L		5.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Acetone	01	SW8260B	<10.0 ug/L		10.0	1	11/07/17 14:30	11/07/17 14:30	KCS
Benzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Bromobenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Bromochloromethane	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Bromodichloromethane	01	SW8260B	<0.50 ug/L		0.50	1	11/07/17 14:30	11/07/17 14:30	KCS
Bromoform	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Bromomethane	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Carbon disulfide	01	SW8260B	<10.0 ug/L		10.0	1	11/07/17 14:30	11/07/17 14:30	KCS
Carbon tetrachloride	01	SW8260B	5.38 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Chlorobenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Chloroethane	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Chloroform	01	SW8260B	9.43 ug/L		0.50	1	11/07/17 14:30	11/07/17 14:30	KCS
Chloromethane	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
cis-1,2-Dichloroethylene	01	SW8260B	1.47 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
cis-1,3-Dichloropropene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Dibromochloromethane	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Dibromomethane	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Dichlorodifluoromethane	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Di-isopropyl ether (DIPE)	01	SW8260B	<5.00 ug/L		5.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Ethylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Hexachlorobutadiene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Iodomethane	01	SW8260B	<10.0 ug/L		10.0	1	11/07/17 14:30	11/07/17 14:30	KCS
Isopropylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
m+p-Xylenes	01	SW8260B	<2.00 ug/L		2.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Methylene chloride	01	SW8260B	<4.00 ug/L		4.00	1	11/07/17 14:30	11/07/17 14:30	KCS

K451122-17



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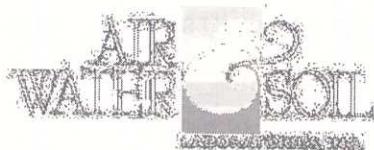
Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results		Laboratory Sample ID: 17K0149-01						
Sample I.D.	ASMW-01R							
Grab Date/Time:	11/06/2017 13:00							
Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time
<b>Volatile Organic Compounds by GCMS</b>								
Methyl-t-butyl ether (MTBE)	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
Naphthalene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
n-Butylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
n-Propylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
o-Xylene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
sec-Butylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
Styrene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
tert-Butylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
Tetrachloroethylene (PCE)	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
Toluene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
trans-1,2-Dichloroethylene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
trans-1,3-Dichloropropene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
Trichloroethylene	01	SW8260B	5.62 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
Trichlorofluoromethane	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30
Vinyl acetate	01	SW8260B	<10.0 ug/L		10.0	1	11/07/17 14:30	11/07/17 14:30
Vinyl chloride	01	SW8260B	<0.50 ug/L		0.50	1	11/07/17 14:30	11/07/17 14:30
Xylenes, Total	01	SW8260B	<3.00 ug/L		3.00	1	11/07/17 14:30	11/07/17 14:30
Surr: 1,2-Dichloroethane-d4 (Surr)	01	SW8260B	110 %		70-120		11/07/17 14:30	11/07/17 14:30
Surr: 4-Bromofluorobenzene (Surr)	01	SW8260B	90.2 %		75-120		11/07/17 14:30	11/07/17 14:30
Surr: Dibromofluoromethane (Surr)	01	SW8260B	109 %		80-119		11/07/17 14:30	11/07/17 14:30
Surr: Toluene-d8 (Surr)	01	SW8260B	101 %		85-120		11/07/17 14:30	11/07/17 14:30
<b>Head Space Analysis by GC</b>								
Ethane	01	RSK175M	<5.00 ug/L		5.00	1	11/10/17 11:03	11/10/17 11:03
Ethene	01	RSK175M	<5.00 ug/L		5.00	1	11/10/17 11:03	11/10/17 11:03

KPD 11/22/17



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Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

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#### Analytical Results

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Sample I.D. ASMW-01R Laboratory Sample ID: 17K0149-01

Grab Date/Time: 11/06/2017 13:00

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
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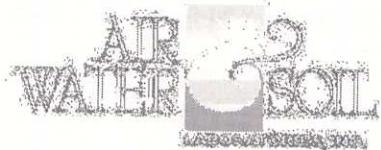
#### Head Space Analysis by GC

Methane	01	RSK175M	15.8 ug/L		5.00	1	11/10/17 11:03	11/10/17 11:03	RJW
Surr: Acetylene (Surr)	01	RSK175M	118 %		70-130		11/10/17 11:03	11/10/17 11:03	RJW

#### Wet Chemistry Analysis

Alkalinity	01	SM22 2320B-2011	29.0 mg/L J		5.0	1	11/15/17 09:55	11/15/17 09:55	DLF
Chloride	01RE2	EPA300.0 R2.1	39.8 mg/L		10.0	1	11/10/17 12:16	11/10/17 12:16	JSKL
Nitrate as N	01	Calc.	2.22 mg/L		0.150	1	11/14/17 16:35	11/14/17 16:35	DLF
Nitrate+Nitrite as N	01	SM22 4500-NO3F-2011	2.22 mg/L		0.10	1	11/14/17 16:35	11/14/17 16:35	JCM
Nitrite as N	01	SM22 4500-NO2B-2011	<0.05 mg/L		0.05	1	11/07/17 11:00	11/07/17 11:00	DLF
Sulfate	01	EPA300.0 R2.1	424 mg/L		100	100	11/09/17 16:12	11/09/17 16:12	JSKL
Sulfide	01	SW9215	<1.00 mg/L		1.00	1	11/09/17 09:50	11/09/17 09:50	DLF
TOC (Min)	01	SW9060A	2.3 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL
TOC (Max)	01	SW9060A	2.4 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL
TOC (Mean)	01	SW9060A	2.4 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL

RJD 11/22/17



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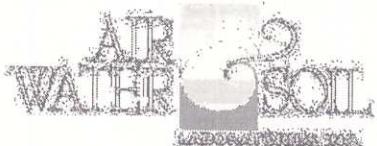
Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results										
Sample I.D.	ASMW-02	Laboratory Sample ID: 17K0149-02								
Grab Date/Time:	11/06/2017 14:30	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GCMS</b>										
1,1,1,2-Tetrachloroethane	02	SW8260B		<0.40 ug/L		0.40	1	11/07/17 14:54	11/07/17 14:54	KCS
1,1,1-Trichloroethane	02	SW8260B		1.06 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,1,2,2-Tetrachloroethane	02	SW8260B		10.7 ug/L		0.40	1	11/07/17 14:54	11/07/17 14:54	KCS
1,1,2-Trichloroethane	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,1-Dichloroethane	02	SW8260B		74.6 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,1-Dichloroethylene	02	SW8260B		81.0 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,1-Dichloropropene	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,2,3-Trichlorobenzene	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,2,3-Trichloropropane	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,2,4-Trichlorobenzene	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,2,4-Trimethylbenzene	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,2-Dibromo-3-chloropropane (DBCP)	02	SW8260B		<4.00 ug/L		4.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,2-Dibromoethane (EDB)	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,2-Dichlorobenzene	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,2-Dichloroethane	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,2-Dichloropropane	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,3,5-Trimethylbenzene	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,3-Dichlorobenzene	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,3-Dichloropropane	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,4-Dichlorobenzene	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
2,2-Dichloropropane	02	SW8260B		<2.00 ug/L		2.00	1	11/07/17 14:54	11/07/17 14:54	KCS
2-Butanone (MEK)	02	SW8260B		<10.0 ug/L		10.0	1	11/07/17 14:54	11/07/17 14:54	KCS
2-Chlorotoluene	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
2-Hexanone (MBK)	02	SW8260B		<5.00 ug/L		5.00	1	11/07/17 14:54	11/07/17 14:54	KCS
4-Chlorotoluene	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
4-Isopropyltoluene	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS

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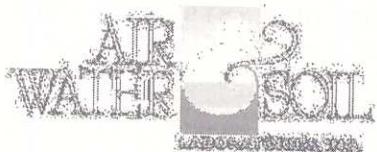
Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results										
Sample I.D.	ASMW-02	Laboratory Sample ID: 17K0149-02								
Grab Date/Time:	11/06/2017 14:30	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GCMS</b>										
4-Methyl-2-pentanone (MIBK)	02	SW8260B		<5.00 ug/L		5.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Acetone	02	SW8260B		<10.0 ug/L		10.0	1	11/07/17 14:54	11/07/17 14:54	KCS
Benzene	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Bromobenzene	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Bromoform	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Bromomethane	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Carbon disulfide	02	SW8260B		<10.0 ug/L		10.0	1	11/07/17 14:54	11/07/17 14:54	KCS
Carbon tetrachloride	02	SW8260B		1.44 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Chlorobenzene	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Chloroethane	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Chloroform	02	SW8260B		5.57 ug/L		0.50	1	11/07/17 14:54	11/07/17 14:54	KCS
Chloromethane	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
cis-1,2-Dichloroethylene	02	SW8260B		1.40 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
cis-1,3-Dichloropropene	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Dibromochloromethane	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Dibromomethane	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Dichlorodifluoromethane	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Di-isopropyl ether (DIPE)	02	SW8260B		<5.00 ug/L		5.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Ethylbenzene	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Hexachlorobutadiene	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Iodomethane	02	SW8260B		<10.0 ug/L		10.0	1	11/07/17 14:54	11/07/17 14:54	KCS
Isopropylbenzene	02	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
m+p-Xylenes	02	SW8260B		<2.00 ug/L		2.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Methylene chloride	02	SW8260B		<4.00 ug/L		4.00	1	11/07/17 14:54	11/07/17 14:54	KCS

17K0149-02  
11/07/17



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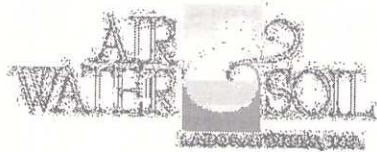
Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results								
Sample I.D.	Laboratory Sample ID: 17K0149-02							
Grab Date/Time:	11/06/2017 14:30							
Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time
<b>Volatile Organic Compounds by GCMS</b>								
Methyl-t-butyl ether (MTBE)	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54
Naphthalene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54
n-Butylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54
n-Propylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54
o-Xylene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54
sec-Butylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54
Styrene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54
tert-Butylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54
Tetrachloroethylene (PCE)	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54
Toluene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54
trans-1,2-Dichloroethylene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54
trans-1,3-Dichloropropene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54
Trichloroethylene	02	SW8260B	2.86 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54
Trichlorofluoromethane	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54
Vinyl acetate	02	SW8260B	<10.0 ug/L		10.0	1	11/07/17 14:54	11/07/17 14:54
Vinyl chloride	02	SW8260B	<0.50 ug/L		0.50	1	11/07/17 14:54	11/07/17 14:54
Xylenes, Total	02	SW8260B	<3.00 ug/L		3.00	1	11/07/17 14:54	11/07/17 14:54
Surr: 1,2-Dichloroethane-d4 (Surr)	02	SW8260B	116 %		70-120		11/07/17 14:54	11/07/17 14:54
Surr: 4-Bromofluorobenzene (Surr)	02	SW8260B	91.0 %		75-120		11/07/17 14:54	11/07/17 14:54
Surr: Dibromofluoromethane (Surr)	02	SW8260B	111 %		80-119		11/07/17 14:54	11/07/17 14:54
Surr: Toluene-d8 (Surr)	02	SW8260B	103 %		85-120		11/07/17 14:54	11/07/17 14:54
<b>Head Space Analysis by GC</b>								
Ethane	02	RSK175M	<5.00 ug/L		5.00	1	11/10/17 11:16	11/10/17 11:16
Ethene	02	RSK175M	<5.00 ug/L		5.00	1	11/10/17 11:16	11/10/17 11:16

KP 11-2217



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### Final Report

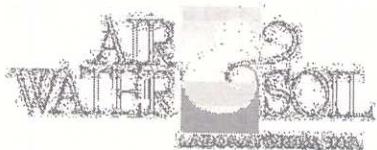
Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results		Laboratory Sample ID: 17K0149-02						
Sample I.D.	ASMW-02							
Grab Date/Time:	11/06/2017 14:30							
Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time Analyst
<b>Head Space Analysis by GC</b>								
Methane	02	RSK175M	10.4 ug/L		5.00	1	11/10/17 11:16	11/10/17 11:16 RJJ
Surr: Acetylene (Surr)	02	RSK175M	101 %		70-130		11/10/17 11:16	11/10/17 11:16 RJJ
<b>Wet Chemistry Analysis</b>								
Alkalinity	02	SM22 2320B-2011	8.0 mg/L		5.0	1	11/15/17 09:55	11/15/17 09:55 DLF
Chloride	02RE1	EPA300.0 R2.1	44.9 mg/L		10.0	10	11/09/17 18:23	11/09/17 18:23 JSKL
Nitrate as N	02	Calc.	2.19 mg/L		0.150	1	11/14/17 16:38	11/14/17 16:38 DLF
Nitrate+Nitrite as N	02	SM22 4500-NO3F-2011	2.19 mg/L		0.10	1	11/14/17 16:38	11/14/17 16:38 JCM
Nitrite as N	02	SM22 4500-NO2B-2011	<0.05 mg/L		0.05	1	11/07/17 11:00	11/07/17 11:00 DLF
Sulfate	02	EPA300.0 R2.1	614 mg/L		100	100	11/09/17 17:57	11/09/17 17:57 JSKL
Sulfide	02	SW9215	<1.00 mg/L		1.00	1	11/09/17 09:50	11/09/17 09:50 DLF
TOC (Min)	02	SW9060A	2.1 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00 JSKL
TOC (Max)	02	SW9060A	2.2 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00 JSKL
TOC (Mean)	02	SW9060A	2.2 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00 JSKL

kg 11-22-17



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## Certificate of Analysis

### *Final Report*

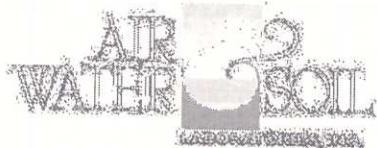
Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results										
Sample I.D.	ASMW-04	Laboratory Sample ID:					17K0149-03			
Grab Date/Time:	11/06/2017 11:30	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GCMS</b>										
1,1,1,2-Tetrachloroethane	03	SW8260B		<0.40 ug/L		0.40	1	11/07/17 15:18	11/07/17 15:18	KCS
<b>1,1,1-Trichloroethane</b>	03	SW8260B		<b>1.06 ug/L</b>		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,1,2,2-Tetrachloroethane	03	SW8260B		<0.40 ug/L		0.40	1	11/07/17 15:18	11/07/17 15:18	KCS
1,1,2-Trichloroethane	03	SW8260B		<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
<b>1,1-Dichloroethane</b>	03	SW8260B		<b>11.6 ug/L</b>		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
<b>1,1-Dichloroethylene</b>	03	SW8260B		<b>56.1 ug/L</b>		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,1-Dichloropropene	03	SW8260B		<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,2,3-Trichlorobenzene	03	SW8260B		<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,2,3-Trichloropropane	03	SW8260B		<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,2,4-Trichlorobenzene	03	SW8260B		<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,2,4-Trimethylbenzene	03	SW8260B		<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,2-Dibromo-3-chloropropane (DBCP)	03	SW8260B		<4.00 ug/L		4.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,2-Dibromoethane (EDB)	03	SW8260B		<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,2-Dichlorobenzene	03	SW8260B		<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,2-Dichloroethane	03	SW8260B		<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,2-Dichloropropane	03	SW8260B		<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,3,5-Trimethylbenzene	03	SW8260B		<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,3-Dichlorobenzene	03	SW8260B		<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,3-Dichloropropane	03	SW8260B		<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,4-Dichlorobenzene	03	SW8260B		<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
2,2-Dichloropropane	03	SW8260B		<2.00 ug/L		2.00	1	11/07/17 15:18	11/07/17 15:18	KCS
2-Butanone (MEK)	03	SW8260B		<10.0 ug/L		10.0	1	11/07/17 15:18	11/07/17 15:18	KCS
2-Chlorotoluene	03	SW8260B		<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
2-Hexanone (MBK)	03	SW8260B		<5.00 ug/L		5.00	1	11/07/17 15:18	11/07/17 15:18	KCS
4-Chlorotoluene	03	SW8260B		<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
4-Isopropyltoluene	03	SW8260B		<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS

17K0149-03  
11/21/2017



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Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

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#### Analytical Results

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Sample I.D. ASMW-04 Laboratory Sample ID: 17K0149-03

Grab Date/Time: 11/06/2017 11:30

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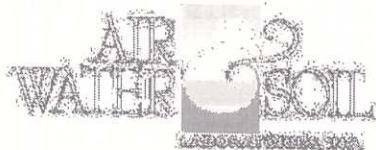
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#### Volatile Organic Compounds by GCMS

4-Methyl-2-pentanone (MIBK)	03	SW8260B	<5.00 ug/L		5.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Acetone	03	SW8260B	<10.0 ug/L		10.0	1	11/07/17 15:18	11/07/17 15:18	KCS
Benzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Bromobenzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Bromoform	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Bromomethane	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Bromodichloromethane	03	SW8260B	<0.50 ug/L		0.50	1	11/07/17 15:18	11/07/17 15:18	KCS
Bromochloromethane	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Carbon disulfide	03	SW8260B	<10.0 ug/L		10.0	1	11/07/17 15:18	11/07/17 15:18	KCS
Carbon tetrachloride	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Chlorobenzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Chloroethane	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Chloroform	03	SW8260B	4.26 ug/L		0.50	1	11/07/17 15:18	11/07/17 15:18	KCS
Chloromethane	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
cis-1,2-Dichloroethylene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
cis-1,3-Dichloropropene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Dibromochloromethane	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Dibromomethane	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Dichlorodifluoromethane	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Di-isopropyl ether (DIPE)	03	SW8260B	<5.00 ug/L		5.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Ethylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Hexachlorobutadiene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Iodomethane	03	SW8260B	<10.0 ug/L		10.0	1	11/07/17 15:18	11/07/17 15:18	KCS
Isopropylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
m+p-Xylenes	03	SW8260B	<2.00 ug/L		2.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Methylene chloride	03	SW8260B	<4.00 ug/L		4.00	1	11/07/17 15:18	11/07/17 15:18	KCS

Kay 11/22/17



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### Final Report

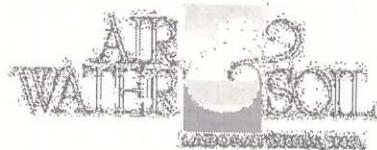
Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results								
Sample I.D.	ASMW-04	Laboratory Sample ID: 17K0149-03						
Grab Date/Time:	11/06/2017 11:30							
Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time Analyst
<b>Volatile Organic Compounds by GCMS</b>								
Methyl-t-butyl ether (MTBE)	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
Naphthalene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
n-Butylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
n-Propylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
o-Xylene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
sec-Butylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
Styrene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
tert-Butylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
Tetrachloroethylene (PCE)	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
Toluene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
trans-1,2-Dichloroethylene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
trans-1,3-Dichloropropene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
Trichloroethylene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
Trichlorofluoromethane	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
Vinyl acetate	03	SW8260B	<10.0 ug/L		10.0	1	11/07/17 15:18	11/07/17 15:18 KCS
Vinyl chloride	03	SW8260B	<0.50 ug/L		0.50	1	11/07/17 15:18	11/07/17 15:18 KCS
Xylenes, Total	03	SW8260B	<3.00 ug/L		3.00	1	11/07/17 15:18	11/07/17 15:18 KCS
Surr: 1,2-Dichloroethane-d4 (Surr)	03	SW8260B	116 %		70-120		11/07/17 15:18	11/07/17 15:18 KCS
Surr: 4-Bromofluorobenzene (Surr)	03	SW8260B	91.0 %		75-120		11/07/17 15:18	11/07/17 15:18 KCS
Surr: Dibromofluoromethane (Surr)	03	SW8260B	112 %		80-119		11/07/17 15:18	11/07/17 15:18 KCS
Surr: Toluene-d8 (Surr)	03	SW8260B	103 %		85-120		11/07/17 15:18	11/07/17 15:18 KCS
<b>Head Space Analysis by GC</b>								
Ethane	03	RSK175M	<5.00 ug/L		5.00	1	11/10/17 11:29	11/10/17 11:29 RJW
Ethene	03	RSK175M	<5.00 ug/L		5.00	1	11/10/17 11:29	11/10/17 11:29 RJW

KP11-2217



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## Certificate of Analysis

### Final Report

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

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#### Analytical Results

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Sample I.D. ASMW-04 Laboratory Sample ID: 17K0149-03

Grab Date/Time: 11/06/2017 11:30

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
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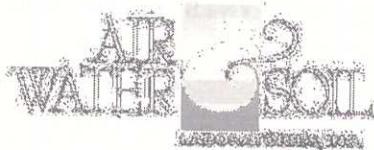
#### Head Space Analysis by GC

Methane	03	RSK175M	<5.00 ug/L		5.00	1	11/10/17 11:29	11/10/17 11:29	RJW
Surr: Acetylene (Surr)	03	RSK175M	115 %		70-130		11/10/17 11:29	11/10/17 11:29	RJW

#### Wet Chemistry Analysis

Alkalinity	03	SM22 2320B-2011	99.0 mg/L		5.0	1	11/15/17 09:55	11/15/17 09:55	DLF
Chloride	03RE1	EPA300.0 R2.1	520 mg/L		100	100	11/10/17 10:05	11/10/17 10:05	JSKL
Nitrate as N	03	Calc.	4.80 mg/L		0.550	1	11/14/17 16:41	11/14/17 16:41	DLF
Nitrate+Nitrite as N	03	SM22 4500-NO3F-2011	4.80 mg/L		0.50	1	11/14/17 16:41	11/14/17 16:41	JCM
Nitrite as N	03	SM22 4500-NO2B-2011	<0.05 mg/L		0.05	1	11/07/17 11:00	11/07/17 11:00	DLF
Sulfate	03RE1	EPA300.0 R2.1	161 mg/L		100	100	11/10/17 10:05	11/10/17 10:05	JSKL
Sulfide	03	SW9215	<1.00 mg/L		1.00	1	11/09/17 09:50	11/09/17 09:50	DLF
TOC (Min)	03	SW9060A	2.6 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL
TOC (Max)	03	SW9060A	2.8 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL
TOC (Mean)	03	SW9060A	2.6 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL

12/11/2017



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## Certificate of Analysis

### Final Report

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

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#### Analytical Results

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Sample I.D. Dup-1 Laboratory Sample ID: 17K0149-04

Grab Date/Time: 11/06/2017 00:00

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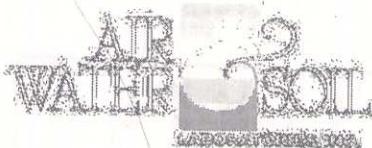
Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
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#### Volatile Organic Compounds by GCMS

1,1,1,2-Tetrachloroethane	04	SW8260B	<0.40 ug/L		0.40	1	11/07/17 15:41	11/07/17 15:41	KCS
1,1,1-Trichloroethane	04	SW8260B	3.25 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,1,2,2-Tetrachloroethane	04	SW8260B	21.9 ug/L		0.40	1	11/07/17 15:41	11/07/17 15:41	KCS
1,1,2-Trichloroethane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,1-Dichloroethane	04	SW8260B	68.8 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,1-Dichloroethylene	04	SW8260B	107 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,1-Dichloropropene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,2,3-Trichlorobenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,2,3-Trichloropropane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,2,4-Trichlorobenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,2,4-Trimethylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,2-Dibromo-3-chloropropane (DBCP)	04	SW8260B	<4.00 ug/L		4.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,2-Dibromoethane (EDB)	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,2-Dichlorobenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,2-Dichloroethane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,2-Dichloropropane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,3,5-Trimethylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,3-Dichlorobenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,3-Dichloropropane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,4-Dichlorobenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
2,2-Dichloropropane	04	SW8260B	<2.00 ug/L		2.00	1	11/07/17 15:41	11/07/17 15:41	KCS
2-Butanone (MEK)	04	SW8260B	<10.0 ug/L		10.0	1	11/07/17 15:41	11/07/17 15:41	KCS
2-Chlorotoluene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
2-Hexanone (MBK)	04	SW8260B	<5.00 ug/L		5.00	1	11/07/17 15:41	11/07/17 15:41	KCS
4-Chlorotoluene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
4-Isopropyltoluene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS

KP112217



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## Certificate of Analysis

### Final Report

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

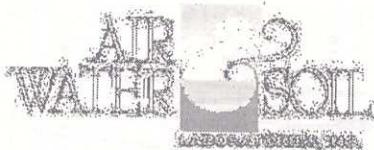
Laboratory Order ID: 17K0149

Analytical Results		Laboratory Sample ID: 17K0149-04						
Sample I.D.	Dup-1							
Grab Date/Time:	11/06/2017 00:00							
Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time Analyst

#### Volatile Organic Compounds by GCMS

4-Methyl-2-pentanone (MIBK)	04	SW8260B	<5.00 ug/L		5.00	1	11/07/17 15:41	11/07/17 15:41 KCS
Acetone	04	SW8260B	<10.0 ug/L		10.0	1	11/07/17 15:41	11/07/17 15:41 KCS
Benzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41 KCS
Bromobenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41 KCS
Bromoform	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41 KCS
Bromochloromethane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41 KCS
Bromodichloromethane	04	SW8260B	<0.50 ug/L		0.50	1	11/07/17 15:41	11/07/17 15:41 KCS
Bromomethane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41 KCS
Carbon disulfide	04	SW8260B	<10.0 ug/L		10.0	1	11/07/17 15:41	11/07/17 15:41 KCS
Carbon tetrachloride	04	SW8260B	4.80 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41 KCS
Chlorobenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41 KCS
Chloroethane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41 KCS
Chloroform	04	SW8260B	8.90 ug/L		0.50	1	11/07/17 15:41	11/07/17 15:41 KCS
Chloromethane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41 KCS
cis-1,2-Dichloroethylene	04	SW8260B	1.47 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41 KCS
cis-1,3-Dichloropropene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41 KCS
Dibromochloromethane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41 KCS
Dibromomethane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41 KCS
Dichlorodifluoromethane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41 KCS
Di-isopropyl ether (DIPE)	04	SW8260B	<5.00 ug/L		5.00	1	11/07/17 15:41	11/07/17 15:41 KCS
Ethylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41 KCS
Hexachlorobutadiene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41 KCS
Iodomethane	04	SW8260B	<10.0 ug/L		10.0	1	11/07/17 15:41	11/07/17 15:41 KCS
Isopropylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41 KCS
m+p-Xylenes	04	SW8260B	<2.00 ug/L		2.00	1	11/07/17 15:41	11/07/17 15:41 KCS
Methylene chloride	04	SW8260B	<4.00 ug/L		4.00	1	11/07/17 15:41	11/07/17 15:41 KCS

11/22/17



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## Certificate of Analysis

### Final Report

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

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#### Analytical Results

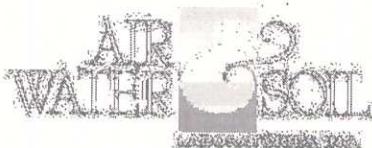
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Sample I.D. Dup-1 Laboratory Sample ID: 17K0149-04

Grab Date/Time: 11/06/2017 00:00

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GCMS</b>									
Methyl-t-butyl ether (MTBE)	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
Naphthalene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
n-Butylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
n-Propylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
o-Xylene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
sec-Butylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
Styrene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
tert-Butylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
Tetrachloroethylene (PCE)	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
Toluene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
trans-1,2-Dichloroethylene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
trans-1,3-Dichloropropene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
Trichloroethylene	04	SW8260B	5.15 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
Trichlorofluoromethane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
Vinyl acetate	04	SW8260B	<10.0 ug/L		10.0	1	11/07/17 15:41	11/07/17 15:41	KCS
Vinyl chloride	04	SW8260B	<0.50 ug/L		0.50	1	11/07/17 15:41	11/07/17 15:41	KCS
Xylenes, Total	04	SW8260B	<3.00 ug/L		3.00	1	11/07/17 15:41	11/07/17 15:41	KCS
Surr: 1,2-Dichloroethane-d4 (Surr)	04	SW8260B	116 %		70-120		11/07/17 15:41	11/07/17 15:41	KCS
Surr: 4-Bromofluorobenzene (Surr)	04	SW8260B	90.4 %		75-120		11/07/17 15:41	11/07/17 15:41	KCS
Surr: Dibromofluoromethane (Surr)	04	SW8260B	112 %		80-119		11/07/17 15:41	11/07/17 15:41	KCS
Surr: Toluene-d8 (Surr)	04	SW8260B	103 %		85-120		11/07/17 15:41	11/07/17 15:41	KCS
<b>Head Space Analysis by GC</b>									
Ethane	04	RSK175M	<5.00 ug/L		5.00	1	11/10/17 11:42	11/10/17 11:42	RJW
Ethene	04	RSK175M	<5.00 ug/L		5.00	1	11/10/17 11:42	11/10/17 11:42	RJW

10/11/2017



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## Certificate of Analysis

### Final Report

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results		Laboratory Sample ID: 17K0149-04						
Sample I.D.	Dup-1							
Grab Date/Time:		11/06/2017 00:00						
Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time Analyst

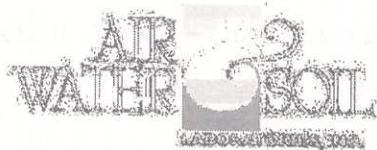
#### Head Space Analysis by GC

Methane	04	RSK175M	14.1 ug/L		5.00	1	11/10/17 11:42	11/10/17 11:42	RJW
Surr: Acetylene (Surr)	04	RSK175M	106 %		70-130		11/10/17 11:42	11/10/17 11:42	RJW

#### Wet Chemistry Analysis

Alkalinity	04	SM22 2320B-2011	13.0 mg/L	J	5.0	1	11/15/17 09:55	11/15/17 09:55	DLF
Chloride	04RE1	EPA300.0 R2.1	34.7 mg/L		10.0	10	11/09/17 19:42	11/09/17 19:42	JSKL
Nitrate as N	04	Calc.	2.10 mg/L		0.550	1	11/14/17 16:56	11/14/17 16:56	DLF
Nitrate+Nitrite as N	04	SM22 4500-NO3F-2011	2.10 mg/L		0.50	1	11/14/17 16:56	11/14/17 16:56	JCM
Nitrite as N	04	SM22 4500-NO2B-2011	<0.05 mg/L		0.05	1	11/07/17 11:00	11/07/17 11:00	DLF
Sulfate	04	EPA300.0 R2.1	421 mg/L		100	100	11/09/17 19:16	11/09/17 19:16	JSKL
Sulfide	04	SW9215	<1.00 mg/L		1.00	1	11/09/17 09:50	11/09/17 09:50	DLF
TOC (Min)	04	SW9060A	2.2 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL
TOC (Max)	04	SW9060A	2.4 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL
TOC (Mean)	04	SW9060A	2.3 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL

KP 11-22-17



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## Certificate of Analysis

### *Final Report*

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

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#### Analytical Results

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Sample I.D. Rinsate Laboratory Sample ID: 17K0149-05

Grab Date/Time: 11/07/2017 06:35

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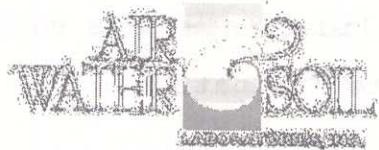
Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
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#### Wet Chemistry Analysis

Nitrate+Nitrite as N	05	SM22 4500-NO3F-2011	<0.10 mg/L		0.10	1	11/14/17 16:59	11/14/17 16:59	JCM
TOC (Min)	05	SW9060A	<1.0 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL
TOC (Max)	05	SW9060A	<1.0 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL
TOC (Mean)	05	SW9060A	<1.0 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL

17K0149-05 11/22/17



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## Certificate of Analysis

### *Final Report*

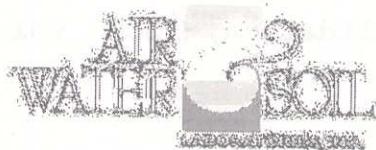
Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results								
Sample I.D.	Field Blank	Laboratory Sample ID:					17K0149-06	
Grab Date/Time:		11/07/2017 06:30						
Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time Analyst
<b>Wet Chemistry Analysis</b>								
Nitrate+Nitrite as N	06	SM22 4500-NO3F-2011	<0.10 mg/L		0.10	1	11/14/17 17:02	11/14/17 17:02 JCM
TOC (Min)	06RE1	SW9060A	<1.0 mg/L		1.0	1	11/13/17 14:00	11/13/17 14:00 JSKL
TOC (Max)	06RE1	SW9060A	<1.0 mg/L		1.0	1	11/13/17 14:00	11/13/17 14:00 JSKL
TOC (Mean)	06RE1	SW9060A	<1.0 mg/L		1.0	1	11/13/17 14:00	11/13/17 14:00 JSKL

12/5/12217



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## Certificate of Analysis

### *Final Report*

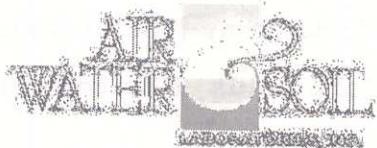
Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results										
Sample I.D.	Trip Blank	Laboratory Sample ID:					17K0149-07			
Grab Date/Time:	11/06/2017 00:00	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GCMS</b>										
1,1,1,2-Tetrachloroethane	07	SW8260B		<0.40 ug/L		0.40	1	11/07/17 14:06	11/07/17 14:06	KCS
1,1,1-Trichloroethane	07	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,1,2,2-Tetrachloroethane	07	SW8260B		<0.40 ug/L		0.40	1	11/07/17 14:06	11/07/17 14:06	KCS
1,1,2-Trichloroethane	07	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,1-Dichloroethane	07	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,1-Dichloroethylene	07	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,1-Dichloropropene	07	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,2,3-Trichlorobenzene	07	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,2,3-Trichloropropane	07	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,2,4-Trichlorobenzene	07	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,2,4-Trimethylbenzene	07	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,2-Dibromo-3-chloropropane (DBCP)	07	SW8260B		<4.00 ug/L		4.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,2-Dibromoethane (EDB)	07	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,2-Dichlorobenzene	07	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,2-Dichloroethane	07	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,2-Dichloropropane	07	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,3,5-Trimethylbenzene	07	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,3-Dichlorobenzene	07	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,3-Dichloropropane	07	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,4-Dichlorobenzene	07	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
2,2-Dichloropropane	07	SW8260B		<2.00 ug/L		2.00	1	11/07/17 14:06	11/07/17 14:06	KCS
2-Butanone (MEK)	07	SW8260B		<10.0 ug/L		10.0	1	11/07/17 14:06	11/07/17 14:06	KCS
2-Chlorotoluene	07	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
2-Hexanone (MBK)	07	SW8260B		<5.00 ug/L		5.00	1	11/07/17 14:06	11/07/17 14:06	KCS
4-Chlorotoluene	07	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
4-Isopropyltoluene	07	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS

17K0149-07



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## Certificate of Analysis

### Final Report

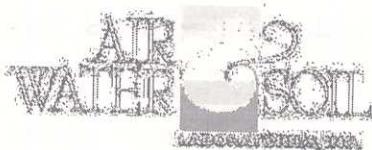
Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results								
Sample I.D.	Trip Blank	Laboratory Sample ID: 17K0149-07						
Grab Date/Time:	11/06/2017 00:00							
Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time
<b>Volatile Organic Compounds by GCMS</b>								
4-Methyl-2-pentanone (MIBK)	07	SW8260B	<5.00 ug/L		5.00	1	11/07/17 14:06	11/07/17 14:06
Acetone	07	SW8260B	<10.0 ug/L		10.0	1	11/07/17 14:06	11/07/17 14:06
Benzene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06
Bromobenzene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06
Bromoform	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06
Bromomethane	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06
Carbon disulfide	07	SW8260B	<10.0 ug/L		10.0	1	11/07/17 14:06	11/07/17 14:06
Carbon tetrachloride	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06
Chlorobenzene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06
Chloroethane	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06
Chloroform	07	SW8260B	<0.50 ug/L		0.50	1	11/07/17 14:06	11/07/17 14:06
Chloromethane	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06
cis-1,2-Dichloroethylene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06
cis-1,3-Dichloropropene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06
Dibromochloromethane	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06
Dibromomethane	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06
Dichlorodifluoromethane	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06
Di-isopropyl ether (DIPE)	07	SW8260B	<5.00 ug/L		5.00	1	11/07/17 14:06	11/07/17 14:06
Ethylbenzene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06
Hexachlorobutadiene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06
Iodomethane	07	SW8260B	<10.0 ug/L		10.0	1	11/07/17 14:06	11/07/17 14:06
Isopropylbenzene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06
m+p-Xylenes	07	SW8260B	<2.00 ug/L		2.00	1	11/07/17 14:06	11/07/17 14:06
Methylene chloride	07	SW8260B	<4.00 ug/L		4.00	1	11/07/17 14:06	11/07/17 14:06

KD 1122-7



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## Certificate of Analysis

### Final Report

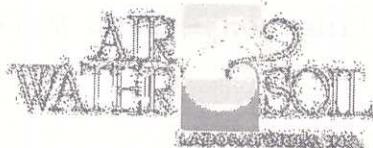
Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results		Laboratory Sample ID: 17K0149-07						
Sample I.D.	Trip Blank							
Grab Date/Time:	11/06/2017 00:00							
Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time Analyst
<b>Volatile Organic Compounds by GCMS</b>								
Methyl-t-butyl ether (MTBE)	07	SW8260B	<1.00 ug/L	1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Naphthalene	07	SW8260B	<1.00 ug/L	1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
n-Butylbenzene	07	SW8260B	<1.00 ug/L	1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
n-Propylbenzene	07	SW8260B	<1.00 ug/L	1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
o-Xylene	07	SW8260B	<1.00 ug/L	1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
sec-Butylbenzene	07	SW8260B	<1.00 ug/L	1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Styrene	07	SW8260B	<1.00 ug/L	1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
tert-Butylbenzene	07	SW8260B	<1.00 ug/L	1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Tetrachloroethylene (PCE)	07	SW8260B	<1.00 ug/L	1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Toluene	07	SW8260B	<1.00 ug/L	1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
trans-1,2-Dichloroethylene	07	SW8260B	<1.00 ug/L	1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
trans-1,3-Dichloropropene	07	SW8260B	<1.00 ug/L	1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Trichloroethylene	07	SW8260B	<1.00 ug/L	1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Trichlorofluoromethane	07	SW8260B	<1.00 ug/L	1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Vinyl acetate	07	SW8260B	<10.0 ug/L	10.0	1	11/07/17 14:06	11/07/17 14:06	KCS
Vinyl chloride	07	SW8260B	<0.50 ug/L	0.50	1	11/07/17 14:06	11/07/17 14:06	KCS
Xylenes, Total	07	SW8260B	<3.00 ug/L	3.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Surr: 1,2-Dichloroethane-d4 (Surr)	07	SW8260B	110 %	70-120		11/07/17 14:06	11/07/17 14:06	KCS
Surr: 4-Bromofluorobenzene (Surr)	07	SW8260B	90.0 %	75-120		11/07/17 14:06	11/07/17 14:06	KCS
Surr: Dibromofluoromethane (Surr)	07	SW8260B	111 %	80-119		11/07/17 14:06	11/07/17 14:06	KCS
Surr: Toluene-d8 (Surr)	07	SW8260B	102 %	85-120		11/07/17 14:06	11/07/17 14:06	KCS
<b>Head Space Analysis by GC</b>								
Ethane	07	RSK175M	<5.00 ug/L	5.00	1	11/10/17 10:50	11/10/17 10:50	RJW
Ethene	07	RSK175M	<5.00 ug/L	5.00	1	11/10/17 10:50	11/10/17 10:50	RJW

KP 11-22-17



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## Certificate of Analysis

### *Final Report*

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

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#### Analytical Results

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Sample I.D. Trip Blank Laboratory Sample ID: 17K0149-07

Grab Date/Time: 11/06/2017 00:00

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
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#### Head Space Analysis by GC

Methane	07	RSK175M	<5.00 ug/L	5.00	1	11/10/17 10:50	11/10/17 10:50	RJW
<i>Surr: Acetylene (Surr)</i>	07	RSK175M	85.8 %	70-130		11/10/17 10:50	11/10/17 10:50	RJW

KJW 11-22-17



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## Certificate of Analysis

*Final Report*

Laboratory Order ID 17K0149

Client Name:	EarthCon Site Services 8700 Trail Lake Drive West Suite 101 Memphis, TN 38125	Date Received:	November 7, 2017 9:21
		Date Issued:	November 21, 2017 14:07
Submitted To:	Matthew Schroeder	Project Number:	[none]
		Purchase Order:	
Client Site I.D.:	BFS-Hopewell		

Enclosed are the results of analyses for samples received by the laboratory on 11/07/2017 09:21. If you have any questions concerning this report, please feel free to contact the laboratory.

Sincerely,

A handwritten signature in black ink that reads "Ted Soyars".

Ted Soyars  
Laboratory Manager

### End Notes:

The test results listed in this report relate only to the samples submitted to the laboratory and as received by the Laboratory.

Unless otherwise noted, the test results for solid materials are calculated on a wet weight basis. Analyses for pH, dissolved oxygen, temperature, residual chlorine and sulfite that are performed in the laboratory do not meet NELAC requirements due to extremely short holding times. These analyses should be performed in the field. The results of field analyses performed by the Sampler included in the Certificate of Analysis are done so at the client's request and are not included in the laboratory's fields of certification nor have they been audited for adherence to a reference method or procedure.

The signature on the final report certifies that these results conform to all applicable NELAC standards unless otherwise specified. For a complete list of the Laboratory's NELAC certified parameters please contact customer service.

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## Certificate of Analysis

### *Final Report*

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

### ANALYTICAL REPORT FOR SAMPLES

Laboratory Order ID 17K0149

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ASMW-01R	17K0149-01	Ground Water	11/06/2017 13:00	11/07/2017 09:21
ASMW-02	17K0149-02	Ground Water	11/06/2017 14:30	11/07/2017 09:21
ASMW-04	17K0149-03	Ground Water	11/06/2017 11:30	11/07/2017 09:21
Dup-1	17K0149-04	Ground Water	11/06/2017 00:00	11/07/2017 09:21
Rinsate	17K0149-05	Ground Water	11/07/2017 06:35	11/07/2017 09:21
Field Blank	17K0149-06	Ground Water	11/07/2017 06:30	11/07/2017 09:21
Trip Blank	17K0149-07	Ground Water	11/06/2017 00:00	11/07/2017 09:21



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## Certificate of Analysis

## *Final Report*

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]

Client Site I.D.: BFS-Hopewell Purchase Order:

**Laboratory Order ID: 17K0149**

Analytical Results									
Sample I.D. ASMW-01R					Laboratory Sample ID: 17K0149-01				
Grab Date/Time:		11/06/2017 13:00							
Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GCMS</b>									
1,1,1,2-Tetrachloroethane	01	SW8260B	<0.40 ug/L		0.40	1	11/07/17 14:30	11/07/17 14:30	KCS
<b>1,1,1-Trichloroethane</b>	01	SW8260B	<b>3.58 ug/L</b>		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
<b>1,1,2,2-Tetrachloroethane</b>	01	SW8260B	<b>22.4 ug/L</b>		0.40	1	11/07/17 14:30	11/07/17 14:30	KCS
1,1,2-Trichloroethane	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
<b>1,1-Dichloroethane</b>	01	SW8260B	<b>74.4 ug/L</b>		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
<b>1,1-Dichloroethylene</b>	01	SW8260B	<b>115 ug/L</b>		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
1,1-Dichloropropene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
1,2,3-Trichlorobenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
1,2,3-Trichloropropane	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
1,2,4-Trichlorobenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
1,2,4-Trimethylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
1,2-Dibromo-3-chloropropane (DBCP)	01	SW8260B	<4.00 ug/L		4.00	1	11/07/17 14:30	11/07/17 14:30	KCS
1,2-Dibromoethane (EDB)	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
1,2-Dichlorobenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
1,2-Dichloroethane	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
1,2-Dichloropropane	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
1,3,5-Trimethylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
1,3-Dichlorobenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
<b>1,3-Dichloropropane</b>	01	SW8260B	<b>1.15 ug/L</b>		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
1,4-Dichlorobenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
2,2-Dichloropropane	01	SW8260B	<2.00 ug/L		2.00	1	11/07/17 14:30	11/07/17 14:30	KCS
2-Butanone (MEK)	01	SW8260B	<10.0 ug/L		10.0	1	11/07/17 14:30	11/07/17 14:30	KCS
2-Chlorotoluene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
2-Hexanone (MBK)	01	SW8260B	<5.00 ug/L		5.00	1	11/07/17 14:30	11/07/17 14:30	KCS
4-Chlorotoluene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
4-Isopropyltoluene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS



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## Certificate of Analysis

### Final Report

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results		Laboratory Sample ID: 17K0149-01								
Sample I.D.	ASMW-01R	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GCMS</b>										
4-Methyl-2-pentanone (MIBK)	01	SW8260B		<5.00 ug/L		5.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Acetone	01	SW8260B		<10.0 ug/L		10.0	1	11/07/17 14:30	11/07/17 14:30	KCS
Benzene	01	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Bromobenzene	01	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Bromochloromethane	01	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Bromodichloromethane	01	SW8260B		<0.50 ug/L		0.50	1	11/07/17 14:30	11/07/17 14:30	KCS
Bromoform	01	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Bromomethane	01	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Carbon disulfide	01	SW8260B		<10.0 ug/L		10.0	1	11/07/17 14:30	11/07/17 14:30	KCS
<b>Carbon tetrachloride</b>	01	SW8260B		<b>5.38 ug/L</b>		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Chlorobenzene	01	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Chloroethane	01	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
<b>Chloroform</b>	01	SW8260B		<b>9.43 ug/L</b>		0.50	1	11/07/17 14:30	11/07/17 14:30	KCS
Chloromethane	01	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
<b>cis-1,2-Dichloroethylene</b>	01	SW8260B		<b>1.47 ug/L</b>		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
cis-1,3-Dichloropropene	01	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Dibromochloromethane	01	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Dibromomethane	01	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Dichlorodifluoromethane	01	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Di-isopropyl ether (DIPE)	01	SW8260B		<5.00 ug/L		5.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Ethylbenzene	01	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Hexachlorobutadiene	01	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Iodomethane	01	SW8260B		<10.0 ug/L		10.0	1	11/07/17 14:30	11/07/17 14:30	KCS
Isopropylbenzene	01	SW8260B		<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
m+p-Xylenes	01	SW8260B		<2.00 ug/L		2.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Methylene chloride	01	SW8260B		<4.00 ug/L		4.00	1	11/07/17 14:30	11/07/17 14:30	KCS



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## Certificate of Analysis

### Final Report

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

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#### Analytical Results

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Sample I.D. ASMW-01R Laboratory Sample ID: 17K0149-01

Grab Date/Time: 11/06/2017 13:00

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
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#### Volatile Organic Compounds by GCMS

Methyl-t-butyl ether (MTBE)	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Naphthalene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
n-Butylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
n-Propylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
o-Xylene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
sec-Butylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Styrene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
tert-Butylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Tetrachloroethylene (PCE)	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Toluene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
trans-1,2-Dichloroethylene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
trans-1,3-Dichloropropene	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
<b>Trichloroethylene</b>	01	SW8260B	<b>5.62 ug/L</b>		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Trichlorofluoromethane	01	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:30	11/07/17 14:30	KCS
Vinyl acetate	01	SW8260B	<10.0 ug/L		10.0	1	11/07/17 14:30	11/07/17 14:30	KCS
Vinyl chloride	01	SW8260B	<0.50 ug/L		0.50	1	11/07/17 14:30	11/07/17 14:30	KCS
Xylenes, Total	01	SW8260B	<3.00 ug/L		3.00	1	11/07/17 14:30	11/07/17 14:30	KCS
<i>Surr: 1,2-Dichloroethane-d4 (Surr)</i>	01	SW8260B	110 %		70-120		11/07/17 14:30	11/07/17 14:30	KCS
<i>Surr: 4-Bromofluorobenzene (Surr)</i>	01	SW8260B	90.2 %		75-120		11/07/17 14:30	11/07/17 14:30	KCS
<i>Surr: Dibromofluoromethane (Surr)</i>	01	SW8260B	109 %		80-119		11/07/17 14:30	11/07/17 14:30	KCS
<i>Surr: Toluene-d8 (Surr)</i>	01	SW8260B	101 %		85-120		11/07/17 14:30	11/07/17 14:30	KCS

#### Head Space Analysis by GC

Ethane	01	RSK175M	<5.00 ug/L		5.00	1	11/10/17 11:03	11/10/17 11:03	RJW
Ethene	01	RSK175M	<5.00 ug/L		5.00	1	11/10/17 11:03	11/10/17 11:03	RJW



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## Certificate of Analysis

### *Final Report*

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results		Laboratory Sample ID: 17K0149-01						
Sample I.D.	ASMW-01R							
Grab Date/Time:		11/06/2017 13:00						
Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time
<b>Head Space Analysis by GC</b>								
Methane	01	RSK175M	15.8 ug/L		5.00	1	11/10/17 11:03	11/10/17 11:03
Surr: Acetylene (Surr)	01	RSK175M	118 %		70-130		11/10/17 11:03	11/10/17 11:03
<b>Wet Chemistry Analysis</b>								
Alkalinity	01	SM22 2320B-2011	29.0 mg/L		5.0	1	11/15/17 09:55	11/15/17 09:55
Chloride	01RE2	EPA300.0 R2.1	39.8 mg/L		10.0	1	11/10/17 12:16	11/10/17 12:16
Nitrate as N	01	Calc.	2.22 mg/L		0.150	1	11/14/17 16:35	11/14/17 16:35
Nitrate+Nitrite as N	01	SM22 4500-NO3F-2011	2.22 mg/L		0.10	1	11/14/17 16:35	11/14/17 16:35
Nitrite as N	01	SM22 4500-NO2B-2011	<0.05 mg/L		0.05	1	11/07/17 11:00	11/07/17 11:00
Sulfate	01	EPA300.0 R2.1	424 mg/L		100	100	11/09/17 16:12	11/09/17 16:12
Sulfide	01	SW9215	<1.00 mg/L		1.00	1	11/09/17 09:50	11/09/17 09:50
TOC (Min)	01	SW9060A	2.3 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00
TOC (Max)	01	SW9060A	2.4 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00
TOC (Mean)	01	SW9060A	2.4 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00



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## Certificate of Analysis

### Final Report

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

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#### Analytical Results

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Sample I.D. ASMW-02 Laboratory Sample ID: 17K0149-02

Grab Date/Time: 11/06/2017 14:30

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
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#### Volatile Organic Compounds by GCMS

1,1,1,2-Tetrachloroethane	02	SW8260B	<0.40 ug/L		0.40	1	11/07/17 14:54	11/07/17 14:54	KCS
<b>1,1,1-Trichloroethane</b>	02	SW8260B	<b>1.06 ug/L</b>		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
<b>1,1,2,2-Tetrachloroethane</b>	02	SW8260B	<b>10.7 ug/L</b>		0.40	1	11/07/17 14:54	11/07/17 14:54	KCS
1,1,2-Trichloroethane	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
<b>1,1-Dichloroethane</b>	02	SW8260B	<b>74.6 ug/L</b>		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
<b>1,1-Dichloroethylene</b>	02	SW8260B	<b>81.0 ug/L</b>		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,1-Dichloropropene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,2,3-Trichlorobenzene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,2,3-Trichloropropane	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,2,4-Trichlorobenzene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,2,4-Trimethylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,2-Dibromo-3-chloropropane (DBCP)	02	SW8260B	<4.00 ug/L		4.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,2-Dibromoethane (EDB)	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,2-Dichlorobenzene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,2-Dichloroethane	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,2-Dichloropropane	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,3,5-Trimethylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,3-Dichlorobenzene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,3-Dichloropropane	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
1,4-Dichlorobenzene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
2,2-Dichloropropane	02	SW8260B	<2.00 ug/L		2.00	1	11/07/17 14:54	11/07/17 14:54	KCS
2-Butanone (MEK)	02	SW8260B	<10.0 ug/L		10.0	1	11/07/17 14:54	11/07/17 14:54	KCS
2-Chlorotoluene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
2-Hexanone (MBK)	02	SW8260B	<5.00 ug/L		5.00	1	11/07/17 14:54	11/07/17 14:54	KCS
4-Chlorotoluene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
4-Isopropyltoluene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS



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## Certificate of Analysis

### Final Report

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results		Laboratory Sample ID: 17K0149-02							
Sample I.D.	ASMW-02								
Grab Date/Time:		11/06/2017 14:30							
Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst

#### Volatile Organic Compounds by GCMS

4-Methyl-2-pentanone (MIBK)	02	SW8260B	<5.00 ug/L		5.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Acetone	02	SW8260B	<10.0 ug/L		10.0	1	11/07/17 14:54	11/07/17 14:54	KCS
Benzene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Bromobenzene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Bromochloromethane	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Bromodichloromethane	02	SW8260B	<0.50 ug/L		0.50	1	11/07/17 14:54	11/07/17 14:54	KCS
Bromoform	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Bromomethane	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Carbon disulfide	02	SW8260B	<10.0 ug/L		10.0	1	11/07/17 14:54	11/07/17 14:54	KCS
<b>Carbon tetrachloride</b>	02	SW8260B	<b>1.44 ug/L</b>		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Chlorobenzene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Chloroethane	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
<b>Chloroform</b>	02	SW8260B	<b>5.57 ug/L</b>		0.50	1	11/07/17 14:54	11/07/17 14:54	KCS
Chloromethane	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
<b>cis-1,2-Dichloroethylene</b>	02	SW8260B	<b>1.40 ug/L</b>		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
cis-1,3-Dichloropropene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Dibromochloromethane	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Dibromomethane	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Dichlorodifluoromethane	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Di-isopropyl ether (DIPE)	02	SW8260B	<5.00 ug/L		5.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Ethylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Hexachlorobutadiene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Iodomethane	02	SW8260B	<10.0 ug/L		10.0	1	11/07/17 14:54	11/07/17 14:54	KCS
Isopropylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
m+p-Xylenes	02	SW8260B	<2.00 ug/L		2.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Methylene chloride	02	SW8260B	<4.00 ug/L		4.00	1	11/07/17 14:54	11/07/17 14:54	KCS



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## Certificate of Analysis

### Final Report

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

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#### Analytical Results

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Sample I.D. ASMW-02 Laboratory Sample ID: 17K0149-02

Grab Date/Time: 11/06/2017 14:30

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
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#### Volatile Organic Compounds by GCMS

Methyl-t-butyl ether (MTBE)	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Naphthalene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
n-Butylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
n-Propylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
o-Xylene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
sec-Butylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Styrene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
tert-Butylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Tetrachloroethylene (PCE)	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Toluene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
trans-1,2-Dichloroethylene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
trans-1,3-Dichloropropene	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
<b>Trichloroethylene</b>	02	SW8260B	<b>2.86 ug/L</b>		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Trichlorofluoromethane	02	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:54	11/07/17 14:54	KCS
Vinyl acetate	02	SW8260B	<10.0 ug/L		10.0	1	11/07/17 14:54	11/07/17 14:54	KCS
Vinyl chloride	02	SW8260B	<0.50 ug/L		0.50	1	11/07/17 14:54	11/07/17 14:54	KCS
Xylenes, Total	02	SW8260B	<3.00 ug/L		3.00	1	11/07/17 14:54	11/07/17 14:54	KCS
<i>Surr: 1,2-Dichloroethane-d4 (Surr)</i>	02	SW8260B	116 %		70-120		11/07/17 14:54	11/07/17 14:54	KCS
<i>Surr: 4-Bromofluorobenzene (Surr)</i>	02	SW8260B	91.0 %		75-120		11/07/17 14:54	11/07/17 14:54	KCS
<i>Surr: Dibromofluoromethane (Surr)</i>	02	SW8260B	111 %		80-119		11/07/17 14:54	11/07/17 14:54	KCS
<i>Surr: Toluene-d8 (Surr)</i>	02	SW8260B	103 %		85-120		11/07/17 14:54	11/07/17 14:54	KCS

#### Head Space Analysis by GC

Ethane	02	RSK175M	<5.00 ug/L		5.00	1	11/10/17 11:16	11/10/17 11:16	RJW
Ethene	02	RSK175M	<5.00 ug/L		5.00	1	11/10/17 11:16	11/10/17 11:16	RJW



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## Certificate of Analysis

### *Final Report*

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results									
Sample I.D.	Laboratory Sample ID: 17K0149-02								
Grab Date/Time:		11/06/2017 14:30							
Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Head Space Analysis by GC</b>									
Methane	02	RSK175M	10.4 ug/L		5.00	1	11/10/17 11:16	11/10/17 11:16	RJW
Surr: Acetylene (Surr)	02	RSK175M	101 %		70-130		11/10/17 11:16	11/10/17 11:16	RJW
<b>Wet Chemistry Analysis</b>									
Alkalinity	02	SM22 2320B-2011	8.0 mg/L		5.0	1	11/15/17 09:55	11/15/17 09:55	DLF
Chloride	02RE1	EPA300.0 R2.1	44.9 mg/L		10.0	10	11/09/17 18:23	11/09/17 18:23	JSKL
Nitrate as N	02	Calc.	2.19 mg/L		0.150	1	11/14/17 16:38	11/14/17 16:38	DLF
Nitrate+Nitrite as N	02	SM22 4500-NO3F-2011	2.19 mg/L		0.10	1	11/14/17 16:38	11/14/17 16:38	JCM
Nitrite as N	02	SM22 4500-NO2B-2011	<0.05 mg/L		0.05	1	11/07/17 11:00	11/07/17 11:00	DLF
Sulfate	02	EPA300.0 R2.1	614 mg/L		100	100	11/09/17 17:57	11/09/17 17:57	JSKL
Sulfide	02	SW9215	<1.00 mg/L		1.00	1	11/09/17 09:50	11/09/17 09:50	DLF
TOC (Min)	02	SW9060A	2.1 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL
TOC (Max)	02	SW9060A	2.2 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL
TOC (Mean)	02	SW9060A	2.2 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL



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## Certificate of Analysis

### Final Report

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

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#### Analytical Results

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Sample I.D. ASMW-04 Laboratory Sample ID: 17K0149-03

Grab Date/Time: 11/06/2017 11:30

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
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#### Volatile Organic Compounds by GCMS

1,1,1,2-Tetrachloroethane	03	SW8260B	<0.40 ug/L		0.40	1	11/07/17 15:18	11/07/17 15:18	KCS
<b>1,1,1-Trichloroethane</b>	03	SW8260B	<b>1.06 ug/L</b>		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,1,2,2-Tetrachloroethane	03	SW8260B	<0.40 ug/L		0.40	1	11/07/17 15:18	11/07/17 15:18	KCS
1,1,2-Trichloroethane	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
<b>1,1-Dichloroethane</b>	03	SW8260B	<b>11.6 ug/L</b>		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
<b>1,1-Dichloroethylene</b>	03	SW8260B	<b>56.1 ug/L</b>		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,1-Dichloropropene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,2,3-Trichlorobenzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,2,3-Trichloropropane	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,2,4-Trichlorobenzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,2,4-Trimethylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,2-Dibromo-3-chloropropane (DBCP)	03	SW8260B	<4.00 ug/L		4.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,2-Dibromoethane (EDB)	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,2-Dichlorobenzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,2-Dichloroethane	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,2-Dichloropropane	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,3,5-Trimethylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,3-Dichlorobenzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,3-Dichloropropane	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
1,4-Dichlorobenzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
2,2-Dichloropropane	03	SW8260B	<2.00 ug/L		2.00	1	11/07/17 15:18	11/07/17 15:18	KCS
2-Butanone (MEK)	03	SW8260B	<10.0 ug/L		10.0	1	11/07/17 15:18	11/07/17 15:18	KCS
2-Chlorotoluene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
2-Hexanone (MBK)	03	SW8260B	<5.00 ug/L		5.00	1	11/07/17 15:18	11/07/17 15:18	KCS
4-Chlorotoluene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
4-Isopropyltoluene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS



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## Certificate of Analysis

### Final Report

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

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#### Analytical Results

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Sample I.D. ASMW-04 Laboratory Sample ID: 17K0149-03

Grab Date/Time: 11/06/2017 11:30

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
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#### Volatile Organic Compounds by GCMS

4-Methyl-2-pentanone (MIBK)	03	SW8260B	<5.00 ug/L		5.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Acetone	03	SW8260B	<10.0 ug/L		10.0	1	11/07/17 15:18	11/07/17 15:18	KCS
Benzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Bromobenzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Bromochloromethane	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Bromodichloromethane	03	SW8260B	<0.50 ug/L		0.50	1	11/07/17 15:18	11/07/17 15:18	KCS
Bromoform	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Bromomethane	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Carbon disulfide	03	SW8260B	<10.0 ug/L		10.0	1	11/07/17 15:18	11/07/17 15:18	KCS
Carbon tetrachloride	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Chlorobenzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Chloroethane	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
<b>Chloroform</b>	03	SW8260B	<b>4.26 ug/L</b>		0.50	1	11/07/17 15:18	11/07/17 15:18	KCS
Chloromethane	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
cis-1,2-Dichloroethylene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
cis-1,3-Dichloropropene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Dibromochloromethane	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Dibromomethane	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Dichlorodifluoromethane	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Di-isopropyl ether (DIPE)	03	SW8260B	<5.00 ug/L		5.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Ethylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Hexachlorobutadiene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Iodomethane	03	SW8260B	<10.0 ug/L		10.0	1	11/07/17 15:18	11/07/17 15:18	KCS
Isopropylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18	KCS
m+p-Xylenes	03	SW8260B	<2.00 ug/L		2.00	1	11/07/17 15:18	11/07/17 15:18	KCS
Methylene chloride	03	SW8260B	<4.00 ug/L		4.00	1	11/07/17 15:18	11/07/17 15:18	KCS



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## Certificate of Analysis

### Final Report

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results								
Sample I.D.	ASMW-04	Laboratory Sample ID: 17K0149-03						
Grab Date/Time:		11/06/2017 11:30						
Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time Analyst
<b>Volatile Organic Compounds by GCMS</b>								
Methyl-t-butyl ether (MTBE)	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
Naphthalene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
n-Butylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
n-Propylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
o-Xylene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
sec-Butylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
Styrene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
tert-Butylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
Tetrachloroethylene (PCE)	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
Toluene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
trans-1,2-Dichloroethylene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
trans-1,3-Dichloropropene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
Trichloroethylene	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
Trichlorofluoromethane	03	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:18	11/07/17 15:18 KCS
Vinyl acetate	03	SW8260B	<10.0 ug/L		10.0	1	11/07/17 15:18	11/07/17 15:18 KCS
Vinyl chloride	03	SW8260B	<0.50 ug/L		0.50	1	11/07/17 15:18	11/07/17 15:18 KCS
Xylenes, Total	03	SW8260B	<3.00 ug/L		3.00	1	11/07/17 15:18	11/07/17 15:18 KCS
Surr: 1,2-Dichloroethane-d4 (Surr)	03	SW8260B	116 %		70-120		11/07/17 15:18	11/07/17 15:18 KCS
Surr: 4-Bromofluorobenzene (Surr)	03	SW8260B	91.0 %		75-120		11/07/17 15:18	11/07/17 15:18 KCS
Surr: Dibromofluoromethane (Surr)	03	SW8260B	112 %		80-119		11/07/17 15:18	11/07/17 15:18 KCS
Surr: Toluene-d8 (Surr)	03	SW8260B	103 %		85-120		11/07/17 15:18	11/07/17 15:18 KCS
<b>Head Space Analysis by GC</b>								
Ethane	03	RSK175M	<5.00 ug/L		5.00	1	11/10/17 11:29	11/10/17 11:29 RJW
Ethene	03	RSK175M	<5.00 ug/L		5.00	1	11/10/17 11:29	11/10/17 11:29 RJW



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## Certificate of Analysis

### *Final Report*

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

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#### Analytical Results

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Sample I.D.	ASMW-04	Laboratory Sample ID:	17K0149-03
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Grab Date/Time:	11/06/2017 11:30
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Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
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#### Head Space Analysis by GC

Methane	03	RSK175M	<5.00 ug/L		5.00	1	11/10/17 11:29	11/10/17 11:29	RJW
Surr: Acetylene (Surr)	03	RSK175M	115 %		70-130		11/10/17 11:29	11/10/17 11:29	RJW

#### Wet Chemistry Analysis

Alkalinity	03	SM22 2320B-2011	99.0 mg/L		5.0	1	11/15/17 09:55	11/15/17 09:55	DLF
Chloride	03RE1	EPA300.0 R2.1	520 mg/L		100	100	11/10/17 10:05	11/10/17 10:05	JSKL
Nitrate as N	03	Calc.	4.80 mg/L		0.550	1	11/14/17 16:41	11/14/17 16:41	DLF
Nitrate+Nitrite as N	03	SM22 4500-NO3F-2011	4.80 mg/L		0.50	1	11/14/17 16:41	11/14/17 16:41	JCM
Nitrite as N	03	SM22 4500-NO2B-2011	<0.05 mg/L		0.05	1	11/07/17 11:00	11/07/17 11:00	DLF
Sulfate	03RE1	EPA300.0 R2.1	161 mg/L		100	100	11/10/17 10:05	11/10/17 10:05	JSKL
Sulfide	03	SW9215	<1.00 mg/L		1.00	1	11/09/17 09:50	11/09/17 09:50	DLF
TOC (Min)	03	SW9060A	2.6 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL
TOC (Max)	03	SW9060A	2.8 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL
TOC (Mean)	03	SW9060A	2.6 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL



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## Certificate of Analysis

### Final Report

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

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#### Analytical Results

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Sample I.D. Dup-1 Laboratory Sample ID: 17K0149-04

Grab Date/Time: 11/06/2017 00:00

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
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#### Volatile Organic Compounds by GCMS

1,1,1,2-Tetrachloroethane	04	SW8260B	<0.40 ug/L		0.40	1	11/07/17 15:41	11/07/17 15:41	KCS
<b>1,1,1-Trichloroethane</b>	04	SW8260B	<b>3.25 ug/L</b>		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
<b>1,1,2,2-Tetrachloroethane</b>	04	SW8260B	<b>21.9 ug/L</b>		0.40	1	11/07/17 15:41	11/07/17 15:41	KCS
1,1,2-Trichloroethane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
<b>1,1-Dichloroethane</b>	04	SW8260B	<b>68.8 ug/L</b>		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
<b>1,1-Dichloroethylene</b>	04	SW8260B	<b>107 ug/L</b>		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,1-Dichloropropene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,2,3-Trichlorobenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,2,3-Trichloropropane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,2,4-Trichlorobenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,2,4-Trimethylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,2-Dibromo-3-chloropropane (DBCP)	04	SW8260B	<4.00 ug/L		4.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,2-Dibromoethane (EDB)	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,2-Dichlorobenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,2-Dichloroethane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,2-Dichloropropane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,3,5-Trimethylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,3-Dichlorobenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,3-Dichloropropane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
1,4-Dichlorobenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
2,2-Dichloropropane	04	SW8260B	<2.00 ug/L		2.00	1	11/07/17 15:41	11/07/17 15:41	KCS
2-Butanone (MEK)	04	SW8260B	<10.0 ug/L		10.0	1	11/07/17 15:41	11/07/17 15:41	KCS
2-Chlorotoluene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
2-Hexanone (MBK)	04	SW8260B	<5.00 ug/L		5.00	1	11/07/17 15:41	11/07/17 15:41	KCS
4-Chlorotoluene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
4-Isopropyltoluene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS



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## Certificate of Analysis

### Final Report

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results		Laboratory Sample ID: 17K0149-04						
Sample I.D.	Dup-1							
Grab Date/Time:	11/06/2017 00:00							
Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time
<b>Volatile Organic Compounds by GCMS</b>								
4-Methyl-2-pentanone (MIBK)	04	SW8260B	<5.00 ug/L		5.00	1	11/07/17 15:41	11/07/17 15:41
Acetone	04	SW8260B	<10.0 ug/L		10.0	1	11/07/17 15:41	11/07/17 15:41
Benzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41
Bromobenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41
Bromochloromethane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41
Bromodichloromethane	04	SW8260B	<0.50 ug/L		0.50	1	11/07/17 15:41	11/07/17 15:41
Bromoform	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41
Bromomethane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41
Carbon disulfide	04	SW8260B	<10.0 ug/L		10.0	1	11/07/17 15:41	11/07/17 15:41
<b>Carbon tetrachloride</b>	04	SW8260B	<b>4.80 ug/L</b>		1.00	1	11/07/17 15:41	11/07/17 15:41
Chlorobenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41
Chloroethane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41
<b>Chloroform</b>	04	SW8260B	<b>8.90 ug/L</b>		0.50	1	11/07/17 15:41	11/07/17 15:41
Chloromethane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41
<b>cis-1,2-Dichloroethylene</b>	04	SW8260B	<b>1.47 ug/L</b>		1.00	1	11/07/17 15:41	11/07/17 15:41
cis-1,3-Dichloropropene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41
Dibromochloromethane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41
Dibromomethane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41
Dichlorodifluoromethane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41
Di-isopropyl ether (DIPE)	04	SW8260B	<5.00 ug/L		5.00	1	11/07/17 15:41	11/07/17 15:41
Ethylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41
Hexachlorobutadiene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41
Iodomethane	04	SW8260B	<10.0 ug/L		10.0	1	11/07/17 15:41	11/07/17 15:41
Isopropylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41
m+p-Xylenes	04	SW8260B	<2.00 ug/L		2.00	1	11/07/17 15:41	11/07/17 15:41
Methylene chloride	04	SW8260B	<4.00 ug/L		4.00	1	11/07/17 15:41	11/07/17 15:41



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## Certificate of Analysis

### Final Report

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results									
Sample I.D.	Laboratory Sample ID: 17K0149-04								
Grab Date/Time:	11/06/2017 00:00								
Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GCMS</b>									
Methyl-t-butyl ether (MTBE)	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
Naphthalene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
n-Butylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
n-Propylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
o-Xylene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
sec-Butylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
Styrene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
tert-Butylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
Tetrachloroethylene (PCE)	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
Toluene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
trans-1,2-Dichloroethylene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
trans-1,3-Dichloropropene	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
<b>Trichloroethylene</b>	04	SW8260B	<b>5.15 ug/L</b>		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
Trichlorofluoromethane	04	SW8260B	<1.00 ug/L		1.00	1	11/07/17 15:41	11/07/17 15:41	KCS
Vinyl acetate	04	SW8260B	<10.0 ug/L		10.0	1	11/07/17 15:41	11/07/17 15:41	KCS
Vinyl chloride	04	SW8260B	<0.50 ug/L		0.50	1	11/07/17 15:41	11/07/17 15:41	KCS
Xylenes, Total	04	SW8260B	<3.00 ug/L		3.00	1	11/07/17 15:41	11/07/17 15:41	KCS
<i>Surr: 1,2-Dichloroethane-d4 (Surr)</i>	04	SW8260B	116 %		70-120		11/07/17 15:41	11/07/17 15:41	KCS
<i>Surr: 4-Bromofluorobenzene (Surr)</i>	04	SW8260B	90.4 %		75-120		11/07/17 15:41	11/07/17 15:41	KCS
<i>Surr: Dibromofluoromethane (Surr)</i>	04	SW8260B	112 %		80-119		11/07/17 15:41	11/07/17 15:41	KCS
<i>Surr: Toluene-d8 (Surr)</i>	04	SW8260B	103 %		85-120		11/07/17 15:41	11/07/17 15:41	KCS
<b>Head Space Analysis by GC</b>									
Ethane	04	RSK175M	<5.00 ug/L		5.00	1	11/10/17 11:42	11/10/17 11:42	RJW
Ethene	04	RSK175M	<5.00 ug/L		5.00	1	11/10/17 11:42	11/10/17 11:42	RJW



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## Certificate of Analysis

### *Final Report*

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results									
Sample I.D.	Laboratory Sample ID: 17K0149-04								
Grab Date/Time:		11/06/2017 00:00							
Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Head Space Analysis by GC</b>									
Methane	04	RSK175M	14.1 ug/L		5.00	1	11/10/17 11:42	11/10/17 11:42	RJW
Surr: Acetylene (Surr)	04	RSK175M	106 %		70-130		11/10/17 11:42	11/10/17 11:42	RJW
<b>Wet Chemistry Analysis</b>									
Alkalinity	04	SM22 2320B-2011	13.0 mg/L		5.0	1	11/15/17 09:55	11/15/17 09:55	DLF
Chloride	04RE1	EPA300.0 R2.1	34.7 mg/L		10.0	10	11/09/17 19:42	11/09/17 19:42	JSKL
Nitrate as N	04	Calc.	2.10 mg/L		0.550	1	11/14/17 16:56	11/14/17 16:56	DLF
Nitrate+Nitrite as N	04	SM22 4500-NO3F-2011	2.10 mg/L		0.50	1	11/14/17 16:56	11/14/17 16:56	JCM
Nitrite as N	04	SM22 4500-NO2B-2011	<0.05 mg/L		0.05	1	11/07/17 11:00	11/07/17 11:00	DLF
Sulfate	04	EPA300.0 R2.1	421 mg/L		100	100	11/09/17 19:16	11/09/17 19:16	JSKL
Sulfide	04	SW9215	<1.00 mg/L		1.00	1	11/09/17 09:50	11/09/17 09:50	DLF
TOC (Min)	04	SW9060A	2.2 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL
TOC (Max)	04	SW9060A	2.4 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL
TOC (Mean)	04	SW9060A	2.3 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL



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8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

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#### Analytical Results

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Sample I.D. Rinsate Laboratory Sample ID: 17K0149-05

Grab Date/Time: 11/07/2017 06:35

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Wet Chemistry Analysis</b>									
Nitrate+Nitrite as N	05	SM22 4500-NO3F-2011	<0.10 mg/L		0.10	1	11/14/17 16:59	11/14/17 16:59	JCM
TOC (Min)	05	SW9060A	<1.0 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL
TOC (Max)	05	SW9060A	<1.0 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL
TOC (Mean)	05	SW9060A	<1.0 mg/L		1.0	1	11/10/17 18:00	11/10/17 18:00	JSKL



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### *Final Report*

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8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

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**Analytical Results**

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Sample I.D. Field Blank Laboratory Sample ID: 17K0149-06

Grab Date/Time: 11/07/2017 06:30

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Wet Chemistry Analysis</b>									
Nitrate+Nitrite as N	06	SM22 4500-NO3F-2011	<0.10 mg/L		0.10	1	11/14/17 17:02	11/14/17 17:02	JCM
TOC (Min)	06RE1	SW9060A	<1.0 mg/L		1.0	1	11/13/17 14:00	11/13/17 14:00	JSKL
TOC (Max)	06RE1	SW9060A	<1.0 mg/L		1.0	1	11/13/17 14:00	11/13/17 14:00	JSKL
TOC (Mean)	06RE1	SW9060A	<1.0 mg/L		1.0	1	11/13/17 14:00	11/13/17 14:00	JSKL



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### Final Report

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

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#### Analytical Results

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Sample I.D. Trip Blank Laboratory Sample ID: 17K0149-07

Grab Date/Time: 11/06/2017 00:00

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
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#### Volatile Organic Compounds by GCMS

1,1,1,2-Tetrachloroethane	07	SW8260B	<0.40 ug/L		0.40	1	11/07/17 14:06	11/07/17 14:06	KCS
1,1,1-Trichloroethane	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,1,2,2-Tetrachloroethane	07	SW8260B	<0.40 ug/L		0.40	1	11/07/17 14:06	11/07/17 14:06	KCS
1,1,2-Trichloroethane	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,1-Dichloroethane	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,1-Dichloroethylene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,1-Dichloropropene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,2,3-Trichlorobenzene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,2,3-Trichloropropane	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,2,4-Trichlorobenzene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,2,4-Trimethylbenzene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,2-Dibromo-3-chloropropane (DBCP)	07	SW8260B	<4.00 ug/L		4.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,2-Dibromoethane (EDB)	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,2-Dichlorobenzene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,2-Dichloroethane	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,2-Dichloropropane	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,3,5-Trimethylbenzene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,3-Dichlorobenzene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,3-Dichloropropane	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
1,4-Dichlorobenzene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
2,2-Dichloropropane	07	SW8260B	<2.00 ug/L		2.00	1	11/07/17 14:06	11/07/17 14:06	KCS
2-Butanone (MEK)	07	SW8260B	<10.0 ug/L		10.0	1	11/07/17 14:06	11/07/17 14:06	KCS
2-Chlorotoluene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
2-Hexanone (MBK)	07	SW8260B	<5.00 ug/L		5.00	1	11/07/17 14:06	11/07/17 14:06	KCS
4-Chlorotoluene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
4-Isopropyltoluene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS



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## Certificate of Analysis

### Final Report

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results		Laboratory Sample ID: 17K0149-07							
Sample I.D.	Trip Blank								
Grab Date/Time:	11/06/2017 00:00								
Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst

#### Volatile Organic Compounds by GCMS

4-Methyl-2-pentanone (MIBK)	07	SW8260B	<5.00 ug/L		5.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Acetone	07	SW8260B	<10.0 ug/L		10.0	1	11/07/17 14:06	11/07/17 14:06	KCS
Benzene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Bromobenzene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Bromoform	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Bromochloromethane	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Bromodichloromethane	07	SW8260B	<0.50 ug/L		0.50	1	11/07/17 14:06	11/07/17 14:06	KCS
Bromomethane	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Carbon disulfide	07	SW8260B	<10.0 ug/L		10.0	1	11/07/17 14:06	11/07/17 14:06	KCS
Carbon tetrachloride	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Chlorobenzene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Chloroethane	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Chloroform	07	SW8260B	<0.50 ug/L		0.50	1	11/07/17 14:06	11/07/17 14:06	KCS
Chloromethane	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
cis-1,2-Dichloroethylene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
cis-1,3-Dichloropropene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Dibromochloromethane	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Dibromomethane	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Dichlorodifluoromethane	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Di-isopropyl ether (DIPE)	07	SW8260B	<5.00 ug/L		5.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Ethylbenzene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Hexachlorobutadiene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Iodomethane	07	SW8260B	<10.0 ug/L		10.0	1	11/07/17 14:06	11/07/17 14:06	KCS
Isopropylbenzene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
m+p-Xylenes	07	SW8260B	<2.00 ug/L		2.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Methylene chloride	07	SW8260B	<4.00 ug/L		4.00	1	11/07/17 14:06	11/07/17 14:06	KCS



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## Certificate of Analysis

### Final Report

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results									
Sample I.D.	Trip Blank								
Grab Date/Time:	11/06/2017 00:00								
Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GCMS</b>									
Methyl-t-butyl ether (MTBE)	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Naphthalene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
n-Butylbenzene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
n-Propylbenzene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
o-Xylene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
sec-Butylbenzene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Styrene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
tert-Butylbenzene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Tetrachloroethylene (PCE)	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Toluene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
trans-1,2-Dichloroethylene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
trans-1,3-Dichloropropene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Trichloroethylene	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Trichlorofluoromethane	07	SW8260B	<1.00 ug/L		1.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Vinyl acetate	07	SW8260B	<10.0 ug/L		10.0	1	11/07/17 14:06	11/07/17 14:06	KCS
Vinyl chloride	07	SW8260B	<0.50 ug/L		0.50	1	11/07/17 14:06	11/07/17 14:06	KCS
Xylenes, Total	07	SW8260B	<3.00 ug/L		3.00	1	11/07/17 14:06	11/07/17 14:06	KCS
Surr: 1,2-Dichloroethane-d4 (Surr)	07	SW8260B	110 %		70-120		11/07/17 14:06	11/07/17 14:06	KCS
Surr: 4-Bromofluorobenzene (Surr)	07	SW8260B	90.0 %		75-120		11/07/17 14:06	11/07/17 14:06	KCS
Surr: Dibromofluoromethane (Surr)	07	SW8260B	111 %		80-119		11/07/17 14:06	11/07/17 14:06	KCS
Surr: Toluene-d8 (Surr)	07	SW8260B	102 %		85-120		11/07/17 14:06	11/07/17 14:06	KCS
<b>Head Space Analysis by GC</b>									
Ethane	07	RSK175M	<5.00 ug/L		5.00	1	11/10/17 10:50	11/10/17 10:50	RJW
Ethene	07	RSK175M	<5.00 ug/L		5.00	1	11/10/17 10:50	11/10/17 10:50	RJW



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### *Final Report*

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8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Laboratory Order ID: 17K0149

Analytical Results									
Sample I.D.	Trip Blank	Laboratory Sample ID:						17K0149-07	
Grab Date/Time:		11/06/2017 00:00							
Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Head Space Analysis by GC</b>									
Methane	07	RSK175M	<5.00 ug/L		5.00	1	11/10/17 10:50	11/10/17 10:50	RJW
Surr: Acetylene (Surr)	07	RSK175M	85.8 %		70-130		11/10/17 10:50	11/10/17 10:50	RJW



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8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

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### Analytical Summary

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Wet Chemistry Analysis		Preparation Method: [CALC]			
Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
<b>Wet Chemistry Analysis</b>					
17K0149-01	40.0 mL / 40.0 mL	SW9060A	BAK0337	SAK0346	AH70107
17K0149-02	40.0 mL / 40.0 mL	SW9060A	BAK0337	SAK0346	AH70107
17K0149-03	40.0 mL / 40.0 mL	SW9060A	BAK0337	SAK0346	AH70107
17K0149-04	40.0 mL / 40.0 mL	SW9060A	BAK0337	SAK0346	AH70107
17K0149-05	40.0 mL / 40.0 mL	SW9060A	BAK0337	SAK0346	AH70107
17K0149-06	40.0 mL / 40.0 mL	SW9060A	BAK0337	SAK0346	AH70107
17K0149-06RE1	40.0 mL / 40.0 mL	SW9060A	BAK0337	SAK0377	AD70075
Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
<b>Wet Chemistry Analysis</b>					
17K0149-01	1.00 mL / 1.00 mL	EPA300.0 R2.1	BAK0274	SAK0290	AK70041
17K0149-01RE1	1.00 mL / 1.00 mL	EPA300.0 R2.1	BAK0274	SAK0290	AK70041
17K0149-01RE2	0.100 mL / 1.00 mL	EPA300.0 R2.1	BAK0274	SAK0290	AK70041
17K0149-02	1.00 mL / 1.00 mL	EPA300.0 R2.1	BAK0274	SAK0290	AK70041
17K0149-02RE1	1.00 mL / 1.00 mL	EPA300.0 R2.1	BAK0274	SAK0290	AK70041
17K0149-03	1.00 mL / 1.00 mL	EPA300.0 R2.1	BAK0274	SAK0290	AK70041
17K0149-03RE1	1.00 mL / 1.00 mL	EPA300.0 R2.1	BAK0274	SAK0290	AK70041
17K0149-04	1.00 mL / 1.00 mL	EPA300.0 R2.1	BAK0274	SAK0290	AK70041
17K0149-04RE1	1.00 mL / 1.00 mL	EPA300.0 R2.1	BAK0274	SAK0290	AK70041
Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
<b>Head Space Analysis by GC</b>					
17K0149-01	5.00 mL / 5.00 mL	RSK175M	BAK0310	SAK0330	AB70081
17K0149-02	5.00 mL / 5.00 mL	RSK175M	BAK0310	SAK0330	AB70081
17K0149-03	5.00 mL / 5.00 mL	RSK175M	BAK0310	SAK0330	AB70081
17K0149-04	5.00 mL / 5.00 mL	RSK175M	BAK0310	SAK0330	AB70081
17K0149-07	5.00 mL / 5.00 mL	RSK175M	BAK0310	SAK0330	AB70081



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## Certificate of Analysis

### *Final Report*

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
<b>Wet Chemistry Analysis</b>					
17K0149-01	25.0 mL / 25.0 mL	SM22 4500-NO2B-2011	BAK0192	SAK0201	AG70057
17K0149-02	25.0 mL / 25.0 mL	SM22 4500-NO2B-2011	BAK0192	SAK0201	AG70057
17K0149-03	25.0 mL / 25.0 mL	SM22 4500-NO2B-2011	BAK0192	SAK0201	AG70057
17K0149-04	25.0 mL / 25.0 mL	SM22 4500-NO2B-2011	BAK0192	SAK0201	AG70057
<b>Wet Chemistry Analysis</b>					
17K0149-01	6.00 mL / 6.00 mL	SW9215	BAK0275	SAK0279	
17K0149-02	6.00 mL / 6.00 mL	SW9215	BAK0275	SAK0279	
17K0149-03	6.00 mL / 6.00 mL	SW9215	BAK0275	SAK0279	
17K0149-04	6.00 mL / 6.00 mL	SW9215	BAK0275	SAK0279	
<b>Wet Chemistry Analysis</b>					
17K0149-01	5.00 mL / 5.00 mL	SM22 4500-NO3F-2011	BAK0389	SAK0409	AK70083
17K0149-02	5.00 mL / 5.00 mL	SM22 4500-NO3F-2011	BAK0389	SAK0409	AK70083
17K0149-03	1.00 mL / 5.00 mL	SM22 4500-NO3F-2011	BAK0389	SAK0409	AK70083
<b>Wet Chemistry Analysis</b>					
17K0149-04	1.00 mL / 5.00 mL	SM22 4500-NO3F-2011	BAK0390	SAK0409	AK70083
17K0149-05	5.00 mL / 5.00 mL	SM22 4500-NO3F-2011	BAK0390	SAK0409	AK70083
17K0149-06	5.00 mL / 5.00 mL	SM22 4500-NO3F-2011	BAK0390	SAK0409	AK70083
<b>Wet Chemistry Analysis</b>					
17K0149-01	50.0 mL / 50.0 mL	SM22 2320B-2011	BAK0504	SAK0480	
17K0149-02	100 mL / 100 mL	SM22 2320B-2011	BAK0504	SAK0480	
17K0149-03	50.0 mL / 50.0 mL	SM22 2320B-2011	BAK0504	SAK0480	
17K0149-04	100 mL / 100 mL	SM22 2320B-2011	BAK0504	SAK0480	
<b>Sample ID</b>					
Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
<b>Volatile Organic Compounds by GCMS</b>					
17K0149-01	5.00 mL / 5.00 mL	SW8260B	BAK0219	SAK0221	AK70021
17K0149-02	5.00 mL / 5.00 mL	SW8260B	BAK0219	SAK0221	AK70021
17K0149-03	5.00 mL / 5.00 mL	SW8260B	BAK0219	SAK0221	AK70021
17K0149-04	5.00 mL / 5.00 mL	SW8260B	BAK0219	SAK0221	AK70021
17K0149-07	5.00 mL / 5.00 mL	SW8260B	BAK0219	SAK0221	AK70021



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Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

### Volatile Organic Compounds by GCMS - Quality Control

Air Water and Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD RPD	Limit Qual
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#### Batch BAK0219 - SW5030B

**Blank (BAK0219-BLK1)** Prepared & Analyzed: 11/07/2017

1,1,1,2-Tetrachloroethane	<0.40 ug/L	0.40	ug/L						
1,1,1-Trichloroethane	<1.00 ug/L	1.00	ug/L						
1,1,2,2-Tetrachloroethane	<0.40 ug/L	0.40	ug/L						
1,1,2-Trichloroethane	<1.00 ug/L	1.00	ug/L						
1,1-Dichloroethane	<1.00 ug/L	1.00	ug/L						
1,1-Dichloroethylene	<1.00 ug/L	1.00	ug/L						
1,1-Dichloropropene	<1.00 ug/L	1.00	ug/L						
1,2,3-Trichlorobenzene	<1.00 ug/L	1.00	ug/L						
1,2,3-Trichloropropane	<1.00 ug/L	1.00	ug/L						
1,2,4-Trichlorobenzene	<1.00 ug/L	1.00	ug/L						
1,2,4-Trimethylbenzene	<1.00 ug/L	1.00	ug/L						
1,2-Dibromo-3-chloropropane (DBCP)	<4.00 ug/L	4.00	ug/L						
1,2-Dibromoethane (EDB)	<1.00 ug/L	1.00	ug/L						
1,2-Dichlorobenzene	<1.00 ug/L	1.00	ug/L						
1,2-Dichloroethane	<1.00 ug/L	1.00	ug/L						
1,2-Dichloropropane	<1.00 ug/L	1.00	ug/L						
1,3,5-Trimethylbenzene	<1.00 ug/L	1.00	ug/L						
1,3-Dichlorobenzene	<1.00 ug/L	1.00	ug/L						
1,3-Dichloropropane	<1.00 ug/L	1.00	ug/L						
1,4-Dichlorobenzene	<1.00 ug/L	1.00	ug/L						
2,2-Dichloropropane	<2.00 ug/L	2.00	ug/L						
2-Butanone (MEK)	<10.0 ug/L	10.0	ug/L						
2-Chlorotoluene	<1.00 ug/L	1.00	ug/L						
2-Hexanone (MBK)	<5.00 ug/L	5.00	ug/L						
4-Chlorotoluene	<1.00 ug/L	1.00	ug/L						
4-Isopropyltoluene	<1.00 ug/L	1.00	ug/L						
4-Methyl-2-pentanone (MIBK)	<5.00 ug/L	5.00	ug/L						
Acetone	<10.0 ug/L	10.0	ug/L						
Benzene	<1.00 ug/L	1.00	ug/L						
Bromobenzene	<1.00 ug/L	1.00	ug/L						
Bromochloromethane	<1.00 ug/L	1.00	ug/L						



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Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

#### Volatile Organic Compounds by GCMS - Quality Control

Air Water and Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC Limits	RPD RPD Limit	RPD Qual
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#### Batch BAK0219 - SW5030B

**Blank (BAK0219-BLK1)** Prepared & Analyzed: 11/07/2017

Bromodichloromethane	<0.50 ug/L	0.50	ug/L
Bromoform	<1.00 ug/L	1.00	ug/L
Bromomethane	<1.00 ug/L	1.00	ug/L
Carbon disulfide	<10.0 ug/L	10.0	ug/L
Carbon tetrachloride	<1.00 ug/L	1.00	ug/L
Chlorobenzene	<1.00 ug/L	1.00	ug/L
Chloroethane	<1.00 ug/L	1.00	ug/L
Chloroform	<0.50 ug/L	0.50	ug/L
Chloromethane	<1.00 ug/L	1.00	ug/L
cis-1,2-Dichloroethylene	<1.00 ug/L	1.00	ug/L
cis-1,3-Dichloropropene	<1.00 ug/L	1.00	ug/L
Dibromochloromethane	<1.00 ug/L	1.00	ug/L
Dibromomethane	<1.00 ug/L	1.00	ug/L
Dichlorodifluoromethane	<1.00 ug/L	1.00	ug/L
Di-isopropyl ether (DIPE)	<5.00 ug/L	5.00	ug/L
Ethylbenzene	<1.00 ug/L	1.00	ug/L
Hexachlorobutadiene	<1.00 ug/L	1.00	ug/L
Iodomethane	<10.0 ug/L	10.0	ug/L
Isopropylbenzene	<1.00 ug/L	1.00	ug/L
m+p-Xylenes	<2.00 ug/L	2.00	ug/L
Methylene chloride	<4.00 ug/L	4.00	ug/L
Methyl-t-butyl ether (MTBE)	<1.00 ug/L	1.00	ug/L
Naphthalene	<1.00 ug/L	1.00	ug/L
n-Butylbenzene	<1.00 ug/L	1.00	ug/L
n-Propylbenzene	<1.00 ug/L	1.00	ug/L
o-Xylene	<1.00 ug/L	1.00	ug/L
sec-Butylbenzene	<1.00 ug/L	1.00	ug/L
Styrene	<1.00 ug/L	1.00	ug/L
tert-Butylbenzene	<1.00 ug/L	1.00	ug/L
Tetrachloroethylene (PCE)	<1.00 ug/L	1.00	ug/L
Toluene	<1.00 ug/L	1.00	ug/L



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8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

#### Volatile Organic Compounds by GCMS - Quality Control

Air Water and Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC Limits	RPD RPD Limit	Qual
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#### Batch BAK0219 - SW5030B

Blank (BAK0219-BLK1) Prepared & Analyzed: 11/07/2017						
trans-1,2-Dichloroethylene	<1.00 ug/L	1.00	ug/L			
trans-1,3-Dichloropropene	<1.00 ug/L	1.00	ug/L			
Trichloroethylene	<1.00 ug/L	1.00	ug/L			
Trichlorofluoromethane	<1.00 ug/L	1.00	ug/L			
Vinyl acetate	<10.0 ug/L	10.0	ug/L			
Vinyl chloride	<0.50 ug/L	0.50	ug/L			
Xylenes, Total	<3.00 ug/L	3.00	ug/L			
<i>Surr: 1,2-Dichloroethane-d4 (Surr)</i>	50.9		ug/L	50.0	102	70-120
<i>Surr: 4-Bromofluorobenzene (Surr)</i>	45.1		ug/L	50.0	90.1	75-120
<i>Surr: Dibromofluoromethane (Surr)</i>	56.7		ug/L	50.0	113	80-119
<i>Surr: Toluene-d8 (Surr)</i>	50.9		ug/L	50.0	102	85-120

LCS (BAK0219-BS1) Prepared & Analyzed: 11/07/2017						
1,1,1,2-Tetrachloroethane	49.7 ug/L	0.4	ug/L	50.0 ug/L	99.5	80-130
1,1,1-Trichloroethane	54.5 ug/L	1	ug/L	50.0 ug/L	109	65-130
1,1,2,2-Tetrachloroethane	49.3 ug/L	0.4	ug/L	50.0 ug/L	98.6	65-130
1,1,2-Trichloroethane	51.9 ug/L	1	ug/L	50.0 ug/L	104	75-125
1,1-Dichloroethane	58.0 ug/L	1	ug/L	50.0 ug/L	116	70-135
1,1-Dichloroethylene	54.1 ug/L	1	ug/L	50.0 ug/L	108	70-130
1,1-Dichloropropene	55.2 ug/L	1	ug/L	50.0 ug/L	110	75-135
1,2,3-Trichlorobenzene	49.1 ug/L	1	ug/L	50.0 ug/L	98.1	55-140
1,2,3-Trichloropropane	49.4 ug/L	1	ug/L	50.0 ug/L	98.7	75-125
1,2,4-Trichlorobenzene	50.2 ug/L	1	ug/L	50.0 ug/L	100	65-135
1,2,4-Trimethylbenzene	53.7 ug/L	1	ug/L	50.0 ug/L	107	75-130
1,2-Dibromo-3-chloropropane (DBCP)	50.5 ug/L	4	ug/L	50.0 ug/L	101	50-130
1,2-Dibromoethane (EDB)	51.3 ug/L	1	ug/L	50.0 ug/L	103	80-120
1,2-Dichlorobenzene	50.0 ug/L	1	ug/L	50.0 ug/L	99.9	70-120
1,2-Dichloroethane	51.2 ug/L	1	ug/L	50.0 ug/L	102	70-130
1,2-Dichloropropane	51.7 ug/L	1	ug/L	50.0 ug/L	103	75-125
1,3,5-Trimethylbenzene	55.6 ug/L	1	ug/L	50.0 ug/L	111	75-125
1,3-Dichlorobenzene	52.2 ug/L	1	ug/L	50.0 ug/L	104	75-125



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8700 Trail Lake Drive West Suite 1  
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Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

#### Volatile Organic Compounds by GCMS - Quality Control

Air Water and Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC Limits	RPD RPD Limit	Qual
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#### Batch BAK0219 - SW5030B

LCS (BAK0219-BS1)	Prepared & Analyzed: 11/07/2017						
1,3-Dichloropropane	50.7 ug/L	1	ug/L	50.0 ug/L	101	75-125	
1,4-Dichlorobenzene	50.0 ug/L	1	ug/L	50.0 ug/L	99.9	75-125	
2,2-Dichloropropane	58.2 ug/L	2	ug/L	50.0 ug/L	116	70-135	
2-Butanone (MEK)	44.0 ug/L	10	ug/L	50.0 ug/L	88.0	30-150	
2-Chlorotoluene	55.0 ug/L	1	ug/L	50.0 ug/L	110	75-125	
2-Hexanone (MBK)	44.9 ug/L	5	ug/L	50.0 ug/L	89.8	55-130	
4-Chlorotoluene	53.1 ug/L	1	ug/L	50.0 ug/L	106	75-130	
4-Isopropyltoluene	53.7 ug/L	1	ug/L	50.0 ug/L	107	75-130	
4-Methyl-2-pentanone (MIBK)	44.4 ug/L	5	ug/L	50.0 ug/L	88.7	60-135	
Acetone	53.6 ug/L	10	ug/L	50.0 ug/L	107	40-140	
Benzene	52.3 ug/L	1	ug/L	50.0 ug/L	105	80-120	
Bromobenzene	49.0 ug/L	1	ug/L	50.0 ug/L	98.0	75-125	
Bromochloromethane	54.7 ug/L	1	ug/L	50.0 ug/L	109	65-130	
Bromodichloromethane	51.0 ug/L	0.5	ug/L	50.0 ug/L	102	75-120	
Bromoform	49.8 ug/L	1	ug/L	50.0 ug/L	99.6	70-130	
Bromomethane	58.5 ug/L	1	ug/L	50.0 ug/L	117	30-145	
Carbon disulfide	46.4 ug/L	10	ug/L	50.0 ug/L	92.8	35-160	
Carbon tetrachloride	50.8 ug/L	1	ug/L	50.0 ug/L	102	65-140	
Chlorobenzene	50.1 ug/L	1	ug/L	50.0 ug/L	100	80-120	
Chloroethane	61.6 ug/L	1	ug/L	50.0 ug/L	123	60-135	
Chloroform	52.7 ug/L	0.5	ug/L	50.0 ug/L	105	65-135	
Chloromethane	61.3 ug/L	1	ug/L	50.0 ug/L	123	40-125	
cis-1,2-Dichloroethylene	53.3 ug/L	1	ug/L	50.0 ug/L	107	70-125	
cis-1,3-Dichloropropene	54.1 ug/L	1	ug/L	50.0 ug/L	108	70-130	
Dibromochloromethane	52.0 ug/L	1	ug/L	50.0 ug/L	104	60-135	
Dibromomethane	50.0 ug/L	1	ug/L	50.0 ug/L	100	75-125	
Dichlorodifluoromethane	61.0 ug/L	1	ug/L	50.0 ug/L	122	30-155	
Ethylbenzene	51.6 ug/L	1	ug/L	50.0 ug/L	103	75-125	
Hexachlorobutadiene	49.4 ug/L	1	ug/L	50.0 ug/L	98.7	50-140	
Isopropylbenzene	55.1 ug/L	1	ug/L	50.0 ug/L	110	75-125	
m+p-Xylenes	105 ug/L	2	ug/L	100 ug/L	105	75-130	



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#### Volatile Organic Compounds by GCMS - Quality Control

Air Water and Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC Limits	RPD RPD Limit	RPD Qual
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#### Batch BAK0219 - SW5030B

##### LCS (BAK0219-BS1)

	Prepared & Analyzed: 11/07/2017					
Methylene chloride	56.0 ug/L	4	ug/L	50.0 ug/L	112	55-140
Methyl-t-butyl ether (MTBE)	53.6 ug/L	1	ug/L	50.0 ug/L	107	65-125
Naphthalene	49.0 ug/L	1	ug/L	50.0 ug/L	98.0	55-140
n-Butylbenzene	55.7 ug/L	1	ug/L	50.0 ug/L	111	70-135
n-Propylbenzene	54.1 ug/L	1	ug/L	50.0 ug/L	108	70-130
o-Xylene	52.0 ug/L	1	ug/L	50.0 ug/L	104	80-120
sec-Butylbenzene	56.1 ug/L	1	ug/L	50.0 ug/L	112	70-125
Styrene	51.2 ug/L	1	ug/L	50.0 ug/L	102	65-135
tert-Butylbenzene	55.5 ug/L	1	ug/L	50.0 ug/L	111	70-130
Tetrachloroethylene (PCE)	71.1 ug/L	1	ug/L	50.0 ug/L	142	45-150
Toluene	50.6 ug/L	1	ug/L	50.0 ug/L	101	75-120
trans-1,2-Dichloroethylene	52.5 ug/L	1	ug/L	50.0 ug/L	105	60-140
trans-1,3-Dichloropropene	49.5 ug/L	1	ug/L	50.0 ug/L	99.0	55-140
Trichloroethylene	51.5 ug/L	1	ug/L	50.0 ug/L	103	70-125
Trichlorofluoromethane	55.3 ug/L	1	ug/L	50.0 ug/L	111	60-145
Vinyl chloride	57.6 ug/L	0.5	ug/L	50.0 ug/L	115	50-145
<i>Surr: 1,2-Dichloroethane-d4 (Surr)</i>	52.0		ug/L	50.0 ug/L	104	70-120
<i>Surr: 4-Bromofluorobenzene (Surr)</i>	52.0		ug/L	50.0 ug/L	104	75-120
<i>Surr: Dibromofluoromethane (Surr)</i>	52.3		ug/L	50.0 ug/L	105	80-119
<i>Surr: Toluene-d8 (Surr)</i>	50.0		ug/L	50.0 ug/L	100	85-120

##### Matrix Spike (BAK0219-MS1)

	Source: 17K0149-01 Prepared & Analyzed: 11/07/2017					
1,1,1,2-Tetrachloroethane	48.9 ug/L	0.4	ug/L	50.0 <0.4 ug/L	97.7	80-130
1,1,1-Trichloroethane	56.0 ug/L	1	ug/L	50.0 3.58 ug/L	105	65-130
1,1,2,2-Tetrachloroethane	79.9 ug/L	0.4	ug/L	50.0 22.4 ug/L	115	65-130
1,1,2-Trichloroethane	56.6 ug/L	1	ug/L	50.0 <1 ug/L	112	75-125
1,1-Dichloroethane	123 ug/L	1	ug/L	50.0 74.4 ug/L	96.9	70-135
1,1-Dichloroethylene	148 ug/L	1	ug/L	50.0 115 ug/L	65.7	70-130
1,1-Dichloropropene	54.4 ug/L	1	ug/L	50.0 <1 ug/L	109	75-135
1,2,3-Trichlorobenzene	50.9 ug/L	1	ug/L	50.0 <1 ug/L	102	55-140
1,2,3-Trichloropropane	55.7 ug/L	1	ug/L	50.0 <1 ug/L	111	75-125



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Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

#### Volatile Organic Compounds by GCMS - Quality Control

Air Water and Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD RPD	Limit Qual
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#### Batch BAK0219 - SW5030B

Matrix Spike (BAK0219-MS1)	Source: 17K0149-01		Prepared & Analyzed: 11/07/2017				
1,2,4-Trichlorobenzene	52.3 ug/L	1	ug/L	50.0	<1 ug/L	104	65-135
1,2,4-Trimethylbenzene	52.2 ug/L	1	ug/L	50.0	<1 ug/L	104	75-130
1,2-Dibromo-3-chloropropane (DBCP)	59.8 ug/L	4	ug/L	50.0	<4 ug/L	120	50-130
1,2-Dibromoethane (EDB)	54.4 ug/L	1	ug/L	50.0	<1 ug/L	109	80-120
1,2-Dichlorobenzene	49.5 ug/L	1	ug/L	50.0	<1 ug/L	99.0	70-120
1,2-Dichloroethane	53.1 ug/L	1	ug/L	50.0	<1 ug/L	106	70-130
1,2-Dichloropropane	52.7 ug/L	1	ug/L	50.0	<1 ug/L	105	75-125
1,3,5-Trimethylbenzene	54.8 ug/L	1	ug/L	50.0	<1 ug/L	110	75-125
1,3-Dichlorobenzene	50.2 ug/L	1	ug/L	50.0	<1 ug/L	100	75-125
1,3-Dichloropropane	53.6 ug/L	1	ug/L	50.0	1.15 ug/L	105	75-125
1,4-Dichlorobenzene	48.5 ug/L	1	ug/L	50.0	<1 ug/L	96.6	75-125
2,2-Dichloropropane	54.3 ug/L	2	ug/L	50.0	<2 ug/L	109	70-135
2-Butanone (MEK)	52.2 ug/L	10	ug/L	50.0	<10 ug/L	104	30-150
2-Chlorotoluene	53.5 ug/L	1	ug/L	50.0	<1 ug/L	107	75-125
2-Hexanone (MBK)	56.1 ug/L	5	ug/L	50.0	<5 ug/L	112	55-130
4-Chlorotoluene	50.6 ug/L	1	ug/L	50.0	<1 ug/L	101	75-130
4-Isopropyltoluene	51.6 ug/L	1	ug/L	50.0	<1 ug/L	103	75-130
4-Methyl-2-pentanone (MIBK)	56.1 ug/L	5	ug/L	50.0	<5 ug/L	112	60-135
Acetone	67.0 ug/L	10	ug/L	50.0	<10 ug/L	131	40-140
Benzene	52.1 ug/L	1	ug/L	50.0	<1 ug/L	104	80-120
Bromobenzene	49.0 ug/L	1	ug/L	50.0	<1 ug/L	98.0	75-125
Bromochloromethane	55.0 ug/L	1	ug/L	50.0	<1 ug/L	110	65-130
Bromodichloromethane	52.8 ug/L	0.5	ug/L	50.0	<0.5 ug/L	106	75-120
Bromoform	53.4 ug/L	1	ug/L	50.0	<1 ug/L	107	70-130
Bromomethane	55.0 ug/L	1	ug/L	50.0	<1 ug/L	110	30-145
Carbon disulfide	44.8 ug/L	10	ug/L	50.0	<10 ug/L	88.7	35-160
Carbon tetrachloride	54.7 ug/L	1	ug/L	50.0	5.38 ug/L	98.7	65-140
Chlorobenzene	49.0 ug/L	1	ug/L	50.0	<1 ug/L	98.0	80-120
Chloroethane	59.8 ug/L	1	ug/L	50.0	<1 ug/L	120	60-135
Chloroform	60.9 ug/L	0.5	ug/L	50.0	9.43 ug/L	103	65-135
Chloromethane	59.5 ug/L	1	ug/L	50.0	<1 ug/L	119	40-125



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## Certificate of Analysis

### Final Report

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8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

#### Volatile Organic Compounds by GCMS - Quality Control

Air Water and Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD RPD	Limit Qual
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#### Batch BAK0219 - SW5030B

Matrix Spike (BAK0219-MS1)	Source: 17K0149-01		Prepared & Analyzed: 11/07/2017				
cis-1,2-Dichloroethylene	53.9 ug/L	1	ug/L	50.0	1.47 ug/L	105	70-125
cis-1,3-Dichloropropene	54.2 ug/L	1	ug/L	50.0	<1 ug/L	108	70-130
Dibromochloromethane	54.1 ug/L	1	ug/L	50.0	<1 ug/L	108	60-135
Dibromomethane	53.4 ug/L	1	ug/L	50.0	<1 ug/L	107	75-125
Dichlorodifluoromethane	59.7 ug/L	1	ug/L	50.0	<1 ug/L	119	30-155
Ethylbenzene	50.2 ug/L	1	ug/L	50.0	<1 ug/L	100	75-125
Hexachlorobutadiene	47.0 ug/L	1	ug/L	50.0	<1 ug/L	94.1	50-140
Isopropylbenzene	53.4 ug/L	1	ug/L	50.0	<1 ug/L	107	75-125
m+p-Xylenes	102 ug/L	2	ug/L	100	<2 ug/L	101	75-130
Methylene chloride	54.5 ug/L	4	ug/L	50.0	<4 ug/L	109	55-140
Methyl-t-butyl ether (MTBE)	57.1 ug/L	1	ug/L	50.0	<1 ug/L	114	65-125
Naphthalene	55.0 ug/L	1	ug/L	50.0	<1 ug/L	110	55-140
n-Butylbenzene	54.5 ug/L	1	ug/L	50.0	<1 ug/L	109	70-135
n-Propylbenzene	53.2 ug/L	1	ug/L	50.0	<1 ug/L	106	70-130
o-Xylene	51.5 ug/L	1	ug/L	50.0	<1 ug/L	102	80-120
sec-Butylbenzene	54.4 ug/L	1	ug/L	50.0	<1 ug/L	109	70-125
Styrene	50.0 ug/L	1	ug/L	50.0	<1 ug/L	100	65-135
tert-Butylbenzene	54.2 ug/L	1	ug/L	50.0	<1 ug/L	108	70-130
Tetrachloroethylene (PCE)	67.9 ug/L	1	ug/L	50.0	<1 ug/L	134	45-150
Toluene	50.7 ug/L	1	ug/L	50.0	<1 ug/L	101	75-120
trans-1,2-Dichloroethylene	51.4 ug/L	1	ug/L	50.0	<1 ug/L	102	60-140
trans-1,3-Dichloropropene	52.0 ug/L	1	ug/L	50.0	<1 ug/L	104	55-140
Trichloroethylene	57.0 ug/L	1	ug/L	50.0	5.62 ug/L	103	70-125
Trichlorofluoromethane	53.0 ug/L	1	ug/L	50.0	<1 ug/L	105	60-145
Vinyl chloride	53.6 ug/L	0.5	ug/L	50.0	<0.5 ug/L	107	50-145
<i>Surr: 1,2-Dichloroethane-d4 (Surr)</i>	52.2		ug/L	50.0	ug/L	104	70-120
<i>Surr: 4-Bromofluorobenzene (Surr)</i>	52.0		ug/L	50.0	ug/L	104	75-120
<i>Surr: Dibromofluoromethane (Surr)</i>	52.4		ug/L	50.0	ug/L	105	80-119
<i>Surr: Toluene-d8 (Surr)</i>	50.9		ug/L	50.0	ug/L	102	85-120



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Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

#### Volatile Organic Compounds by GCMS - Quality Control

Air Water and Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BAK0219 - SW5030B

Matrix Spike Dup (BAK0219-MSD1)	Source: 17K0149-01		Prepared & Analyzed: 11/07/2017							
1,1,1,2-Tetrachloroethane	48.5 ug/L	0.4	ug/L	50.0	<0.4 ug/L	97.1	80-130	0.678	30	
1,1,1-Trichloroethane	57.8 ug/L	1	ug/L	50.0	3.58 ug/L	108	65-130	3.09	30	
1,1,2,2-Tetrachloroethane	79.3 ug/L	0.4	ug/L	50.0	22.4 ug/L	114	65-130	0.741	30	
1,1,2-Trichloroethane	55.9 ug/L	1	ug/L	50.0	<1 ug/L	110	75-125	1.26	30	
1,1-Dichloroethane	123 ug/L	1	ug/L	50.0	74.4 ug/L	98.1	70-135	0.463	30	
1,1-Dichloroethylene	152 ug/L	1	ug/L	50.0	115 ug/L	72.9	70-130	2.38	30	
1,1-Dichloropropene	54.9 ug/L	1	ug/L	50.0	<1 ug/L	110	75-135	0.916	30	
1,2,3-Trichlorobenzene	49.8 ug/L	1	ug/L	50.0	<1 ug/L	99.2	55-140	2.28	30	
1,2,3-Trichloropropane	55.2 ug/L	1	ug/L	50.0	<1 ug/L	110	75-125	1.01	30	
1,2,4-Trichlorobenzene	51.2 ug/L	1	ug/L	50.0	<1 ug/L	102	65-135	2.11	30	
1,2,4-Trimethylbenzene	52.8 ug/L	1	ug/L	50.0	<1 ug/L	106	75-130	1.28	30	
1,2-Dibromo-3-chloropropane (DBCP)	58.6 ug/L	4	ug/L	50.0	<4 ug/L	117	50-130	1.94	30	
1,2-Dibromoethane (EDB)	53.3 ug/L	1	ug/L	50.0	<1 ug/L	107	80-120	2.02	30	
1,2-Dichlorobenzene	49.7 ug/L	1	ug/L	50.0	<1 ug/L	99.4	70-120	0.323	30	
1,2-Dichloroethane	54.1 ug/L	1	ug/L	50.0	<1 ug/L	108	70-130	1.86	30	
1,2-Dichloropropane	52.2 ug/L	1	ug/L	50.0	<1 ug/L	104	75-125	0.953	30	
1,3,5-Trimethylbenzene	55.7 ug/L	1	ug/L	50.0	<1 ug/L	111	75-125	1.65	30	
1,3-Dichlorobenzene	50.8 ug/L	1	ug/L	50.0	<1 ug/L	102	75-125	1.23	30	
1,3-Dichloropropane	52.5 ug/L	1	ug/L	50.0	1.15 ug/L	103	75-125	2.02	30	
1,4-Dichlorobenzene	48.5 ug/L	1	ug/L	50.0	<1 ug/L	96.5	75-125	0.0824	30	
2,2-Dichloropropane	55.3 ug/L	2	ug/L	50.0	<2 ug/L	111	70-135	1.86	30	
2-Butanone (MEK)	15.2 ug/L	10	ug/L	50.0	<10 ug/L	30.5	30-150	110	30	P
2-Chlorotoluene	53.4 ug/L	1	ug/L	50.0	<1 ug/L	107	75-125	0.0561	30	
2-Hexanone (MBK)	57.1 ug/L	5	ug/L	50.0	<5 ug/L	114	55-130	1.73	30	
4-Chlorotoluene	51.6 ug/L	1	ug/L	50.0	<1 ug/L	103	75-130	2.07	30	
4-Isopropyltoluene	52.6 ug/L	1	ug/L	50.0	<1 ug/L	105	75-130	1.78	30	
4-Methyl-2-pentanone (MIBK)	54.7 ug/L	5	ug/L	50.0	<5 ug/L	109	60-135	2.62	30	
Acetone	67.4 ug/L	10	ug/L	50.0	<10 ug/L	131	40-140	0.625	30	
Benzene	52.5 ug/L	1	ug/L	50.0	<1 ug/L	105	80-120	0.842	30	
Bromobenzene	49.2 ug/L	1	ug/L	50.0	<1 ug/L	98.3	75-125	0.346	30	
Bromochloromethane	54.7 ug/L	1	ug/L	50.0	<1 ug/L	109	65-130	0.675	30	



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Client Site I.D.: BFS-Hopewell Purchase Order:

### Volatile Organic Compounds by GCMS - Quality Control

Air Water and Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BAK0219 - SW5030B

Matrix Spike Dup (BAK0219-MSD1)	Source: 17K0149-01			Prepared & Analyzed: 11/07/2017					
Bromodichloromethane	52.3 ug/L	0.5	ug/L	50.0	<0.5 ug/L	105	75-120	1.05	30
Bromoform	53.0 ug/L	1	ug/L	50.0	<1 ug/L	106	70-130	0.733	30
Bromomethane	56.8 ug/L	1	ug/L	50.0	<1 ug/L	114	30-145	3.13	30
Carbon disulfide	47.1 ug/L	10	ug/L	50.0	<10 ug/L	93.4	35-160	5.11	30
Carbon tetrachloride	54.7 ug/L	1	ug/L	50.0	5.38 ug/L	98.6	65-140	0.110	30
Chlorobenzene	48.8 ug/L	1	ug/L	50.0	<1 ug/L	97.5	80-120	0.532	30
Chloroethane	61.5 ug/L	1	ug/L	50.0	<1 ug/L	123	60-135	2.84	30
Chloroform	61.6 ug/L	0.5	ug/L	50.0	9.43 ug/L	104	65-135	1.21	30
Chloromethane	61.6 ug/L	1	ug/L	50.0	<1 ug/L	123	40-125	3.62	30
cis-1,2-Dichloroethylene	54.0 ug/L	1	ug/L	50.0	1.47 ug/L	105	70-125	0.297	30
cis-1,3-Dichloropropene	54.1 ug/L	1	ug/L	50.0	<1 ug/L	108	70-130	0.351	30
Dibromochloromethane	53.3 ug/L	1	ug/L	50.0	<1 ug/L	107	60-135	1.49	30
Dibromomethane	52.9 ug/L	1	ug/L	50.0	<1 ug/L	106	75-125	0.903	30
Dichlorodifluoromethane	62.1 ug/L	1	ug/L	50.0	<1 ug/L	124	30-155	3.96	30
Ethylbenzene	50.4 ug/L	1	ug/L	50.0	<1 ug/L	101	75-125	0.557	30
Hexachlorobutadiene	48.0 ug/L	1	ug/L	50.0	<1 ug/L	95.9	50-140	1.92	30
Isopropylbenzene	53.6 ug/L	1	ug/L	50.0	<1 ug/L	107	75-125	0.374	30
m+p-Xylenes	102 ug/L	2	ug/L	100	<2 ug/L	101	75-130	0.0196	30
Methylene chloride	56.4 ug/L	4	ug/L	50.0	<4 ug/L	113	55-140	3.46	30
Methyl-t-butyl ether (MTBE)	57.2 ug/L	1	ug/L	50.0	<1 ug/L	114	65-125	0.192	30
Naphthalene	56.4 ug/L	1	ug/L	50.0	<1 ug/L	113	55-140	2.51	30
n-Butylbenzene	54.8 ug/L	1	ug/L	50.0	<1 ug/L	110	70-135	0.421	30
n-Propylbenzene	52.8 ug/L	1	ug/L	50.0	<1 ug/L	106	70-130	0.906	30
o-Xylene	50.6 ug/L	1	ug/L	50.0	<1 ug/L	101	80-120	1.84	30
sec-Butylbenzene	54.7 ug/L	1	ug/L	50.0	<1 ug/L	109	70-125	0.476	30
Styrene	49.6 ug/L	1	ug/L	50.0	<1 ug/L	99.2	65-135	0.864	30
tert-Butylbenzene	54.8 ug/L	1	ug/L	50.0	<1 ug/L	110	70-130	1.01	30
Tetrachloroethylene (PCE)	69.0 ug/L	1	ug/L	50.0	<1 ug/L	137	45-150	1.67	30
Toluene	50.5 ug/L	1	ug/L	50.0	<1 ug/L	101	75-120	0.454	30
trans-1,2-Dichloroethylene	51.1 ug/L	1	ug/L	50.0	<1 ug/L	102	60-140	0.625	30
trans-1,3-Dichloropropene	51.1 ug/L	1	ug/L	50.0	<1 ug/L	102	55-140	1.75	30



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## Certificate of Analysis

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8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

#### Volatile Organic Compounds by GCMS - Quality Control

Air Water and Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BAK0219 - SW5030B

Matrix Spike Dup (BAK0219-MSD1)	Source: 17K0149-01		Prepared & Analyzed: 11/07/2017						
Trichloroethylene	56.0 ug/L	1	ug/L	50.0	5.62 ug/L	101	70-125	1.68	30
Trichlorofluoromethane	54.6 ug/L	1	ug/L	50.0	<1 ug/L	109	60-145	3.12	30
Vinyl chloride	55.6 ug/L	0.5	ug/L	50.0	<0.5 ug/L	111	50-145	3.72	30
<i>Surr: 1,2-Dichloroethane-d4 (Surr)</i>	50.8		ug/L	50.0	ug/L	102	70-120		
<i>Surr: 4-Bromofluorobenzene (Surr)</i>	50.1		ug/L	50.0	ug/L	100	75-120		
<i>Surr: Dibromofluoromethane (Surr)</i>	52.1		ug/L	50.0	ug/L	104	80-119		
<i>Surr: Toluene-d8 (Surr)</i>	50.8		ug/L	50.0	ug/L	102	85-120		



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Client Site I.D.: BFS-Hopewell Purchase Order:

#### Head Space Analysis by GC - Quality Control

Air Water and Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC Limits	RPD RPD	RPD Limit	Qual
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#### Batch BAK0310 - No Prep VOC

Blank (BAK0310-BLK1)		Prepared & Analyzed: 11/10/2017						
Ethane	<5.00 ug/L	5.00	ug/L					
Ethene	<5.00 ug/L	5.00	ug/L					
Methane	<5.00 ug/L	5.00	ug/L					
Surr: Acetylene (Surr)	413		ug/L	432		95.5	70-130	

LCS (BAK0310-BS1)		Prepared & Analyzed: 11/10/2017						
Ethane	489 ug/L	5.00	ug/L	500	ug/L	97.8	70-130	
Ethene	463 ug/L	5.00	ug/L	464	ug/L	99.7	70-130	
Methane	247 ug/L	5.00	ug/L	266	ug/L	93.0	70-130	
Surr: Acetylene (Surr)	416		ug/L	432	ug/L	96.4	70-130	

LCS Dup (BAK0310-BSD1)		Prepared & Analyzed: 11/10/2017						
Ethane	486 ug/L	5.00	ug/L	500	ug/L	97.2	70-130	0.617
Ethene	460 ug/L	5.00	ug/L	464	ug/L	99.1	70-130	0.598
Methane	249 ug/L	5.00	ug/L	266	ug/L	93.5	70-130	0.484
Surr: Acetylene (Surr)	413		ug/L	432	ug/L	95.6	70-130	

Duplicate (BAK0310-DUP1)		Source: 17K0149-04 Prepared & Analyzed: 11/10/2017						
Ethane	<5.00 ug/L	5.00	ug/L	<5.00 ug/L			NA	20
Ethene	<5.00 ug/L	5.00	ug/L	<5.00 ug/L			NA	20
Methane	15.8 ug/L	5.00	ug/L	14.1 ug/L			11.5	20
Surr: Acetylene (Surr)	457		ug/L	432	ug/L	106	70-130	

Matrix Spike (BAK0310-MS1)		Source: 17K0149-01 Prepared & Analyzed: 11/10/2017						
Ethane	575 ug/L	5.00	ug/L	500	<5.00 ug/L	115	70-130	
Ethene	542 ug/L	5.00	ug/L	464	<5.00 ug/L	117	70-130	
Methane	295 ug/L	5.00	ug/L	266	15.8 ug/L	105	70-130	
Surr: Acetylene (Surr)	514		ug/L	432	ug/L	119	70-130	



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Client Site I.D.: BFS-Hopewell Purchase Order:

### Head Space Analysis by GC - Quality Control

Air Water and Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### **Batch BAK0310 - No Prep VOC**

Matrix Spike Dup (BAK0310-MSD1)	Source: 17K0149-01			Prepared & Analyzed: 11/10/2017					
Ethane	510 ug/L	5.00	ug/L	500	<5.00 ug/L	102	70-130	12.0	20
Ethene	478 ug/L	5.00	ug/L	464	<5.00 ug/L	103	70-130	12.5	20
Methane	261 ug/L	5.00	ug/L	266	15.8 ug/L	92.1	70-130	12.4	20
<i>Surr: Acetylene (Surr)</i>	453		ug/L	432	ug/L	105	70-130		



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Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

#### Wet Chemistry Analysis - Quality Control

#### Air Water and Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD RPD	Limit Qual
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#### Batch BAK0192 - No Prep Wet Chem

Blank (BAK0192-BLK1)		Prepared & Analyzed: 11/07/2017						
Nitrite as N	<0.05 mg/L	0.05	mg/L					
LCS (BAK0192-BS1)		Prepared & Analyzed: 11/07/2017						
Nitrite as N	0.09 mg/L	0.05	mg/L	0.100 mg/L	91.0	80-120		
Matrix Spike (BAK0192-MS1)		Source: 17K0131-11 Prepared & Analyzed: 11/07/2017						
Nitrite as N	0.08 mg/L	0.05	mg/L	0.100 <0.05 mg/L	84.0	80-120		
Matrix Spike Dup (BAK0192-MSD1)		Source: 17K0131-11 Prepared & Analyzed: 11/07/2017						
Nitrite as N	0.08 mg/L	0.05	mg/L	0.100 <0.05 mg/L	84.0	80-120	0.00	20

#### Batch BAK0274 - No Prep IC

Blank (BAK0274-BLK1)		Prepared & Analyzed: 11/09/2017						
Chloride	<1.0 mg/L	1.0	mg/L					
Sulfate	<1.0 mg/L	1.0	mg/L					
LCS (BAK0274-BS1)		Prepared & Analyzed: 11/09/2017						
Chloride	5.1 mg/L	1	mg/L	5.00 mg/L	102	90-110		
Sulfate	5.0 mg/L	1	mg/L	5.00 mg/L	99.4	90-110		
LCS Dup (BAK0274-BSD1)		Prepared & Analyzed: 11/09/2017						
Chloride	5.2 mg/L	1	mg/L	5.00 mg/L	103	90-110	0.856	15
Sulfate	5.0 mg/L	1	mg/L	5.00 mg/L	101	90-110	1.34	15
Matrix Spike (BAK0274-MS1)		Source: 17K0149-01 Prepared & Analyzed: 11/10/2017						
Sulfate	9.7 mg/L	1	mg/L	5.00 4.2 mg/L	109	90-110		M
Chloride	5.6 mg/L	1	mg/L	5.00 <1 mg/L	105	90-110		



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## Certificate of Analysis

### *Final Report*

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

### **Wet Chemistry Analysis - Quality Control**

**Air Water and Soil Laboratories, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD RPD	Limit Qual
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#### **Batch BAK0274 - No Prep IC**

Matrix Spike Dup (BAK0274-MSD1)	Source: 17K0149-01		Prepared & Analyzed: 11/10/2017						
Sulfate	9.9 mg/L	1	mg/L	5.00	4.2 mg/L	113	90-110	15	M
Chloride	5.7 mg/L	1	mg/L	5.00	<1 mg/L	107	90-110	15	

#### **Batch BAK0275 - No Prep Wet Chem**

Blank (BAK0275-BLK1)	Prepared & Analyzed: 11/09/2017								
Sulfide	<1.00 mg/L	1.00	mg/L						
LCS (BAK0275-BS1)	Prepared & Analyzed: 11/09/2017								
Sulfide	4.71 mg/L	1	mg/L	5.00	mg/L	94.2	80-120		
LCS Dup (BAK0275-BSD1)	Prepared & Analyzed: 11/09/2017								
Sulfide	4.78 mg/L	1	mg/L	5.00	mg/L	95.6	80-120	1.48	20
Matrix Spike (BAK0275-MS1)	Source: 17K0149-01		Prepared & Analyzed: 11/09/2017						
Sulfide	5.12 mg/L	1.00	mg/L	5.00	<1.00 mg/L	102	75-125		
Matrix Spike (BAK0275-MS2)	Source: 17K0228-02		Prepared & Analyzed: 11/09/2017						
Sulfide	4.77 mg/L	1.00	mg/L	5.00	<1.00 mg/L	95.4	75-125		
Matrix Spike Dup (BAK0275-MSD1)	Source: 17K0149-01		Prepared & Analyzed: 11/09/2017						
Sulfide	5.05 mg/L	1.00	mg/L	5.00	<1.00 mg/L	101	75-125	1.38	20
Matrix Spike Dup (BAK0275-MSD2)	Source: 17K0228-02		Prepared & Analyzed: 11/09/2017						
Sulfide	4.96 mg/L	1.00	mg/L	5.00	<1.00 mg/L	99.2	75-125	3.91	20



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8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

#### **Wet Chemistry Analysis - Quality Control**

#### **Air Water and Soil Laboratories, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	Limits	RPD RPD	Limit Qual
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#### **Batch BAK0337 - No Prep**

<u>Blank (BAK0337-BLK1)</u>		Prepared & Analyzed: 11/10/2017						
TOC (Min)	<1.0 mg/L	1.0	mg/L					
TOC (Max)	<1.0 mg/L	1.0	mg/L					
TOC (Mean)	<1.0 mg/L	1.0	mg/L					
<u>LCS (BAK0337-BS1)</u>		Prepared & Analyzed: 11/10/2017						
TOC (Mean)	10.9 mg/L	1	mg/L	10.0	mg/L	109	80-120	
<u>Duplicate (BAK0337-DUP1)</u>		Source: 17K0149-01 Prepared & Analyzed: 11/10/2017						
TOC (Min)	2.4 mg/L	1.0	mg/L	2.3 mg/L		2.11	200	
TOC (Max)	2.5 mg/L	1.0	mg/L	2.4 mg/L		1.18	200	
TOC (Mean)	2.4 mg/L	1.0	mg/L	2.4 mg/L		1.42	20	
<u>Matrix Spike (BAK0337-MS1)</u>		Source: 17K0149-02 Prepared & Analyzed: 11/10/2017						
TOC (Mean)	13.0 mg/L	1.0	mg/L	10.0	2.2 mg/L	108	80-120	

#### **Batch BAK0389 - No Prep Wet Chem**

<u>Blank (BAK0389-BLK1)</u>		Prepared & Analyzed: 11/14/2017						
Nitrate+Nitrite as N	<0.10 mg/L	0.10	mg/L					
<u>LCS (BAK0389-BS1)</u>		Prepared & Analyzed: 11/14/2017						
Nitrate+Nitrite as N	2.57 mg/L	0.1	mg/L	2.50	mg/L	103	90-110	
<u>Matrix Spike (BAK0389-MS1)</u>		Source: 17K0135-04 Prepared & Analyzed: 11/14/2017						
Nitrate+Nitrite as N	2.55 mg/L	0.10	mg/L	2.50	<0.10 mg/L	102	90-110	
<u>Matrix Spike Dup (BAK0389-MSD1)</u>		Source: 17K0135-04 Prepared & Analyzed: 11/14/2017						
Nitrate+Nitrite as N	2.81 mg/L	0.10	mg/L	2.50	<0.10 mg/L	112	90-110	9.74
								20 M



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8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

#### **Wet Chemistry Analysis - Quality Control**

#### **Air Water and Soil Laboratories, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD RPD	RPD Limit	Qual
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#### **Batch BAK0390 - No Prep Wet Chem**

<u>Blank (BAK0390-BLK1)</u>										Prepared & Analyzed: 11/14/2017
Nitrate+Nitrite as N	<0.10 mg/L	0.10	mg/L							
<u>LCS (BAK0390-BS1)</u>										Prepared & Analyzed: 11/14/2017
Nitrate+Nitrite as N	2.57 mg/L	0.1	mg/L	2.50	mg/L	103	90-110			
<u>Matrix Spike (BAK0390-MS1)</u>		<b>Source: 17K0212-05</b>								Prepared & Analyzed: 11/14/2017
Nitrate+Nitrite as N	2.85 mg/L	0.10	mg/L	2.50	<0.10 mg/L	114	90-110			M
<u>Matrix Spike Dup (BAK0390-MSD1)</u>		<b>Source: 17K0212-05</b>								Prepared & Analyzed: 11/14/2017
Nitrate+Nitrite as N	2.96 mg/L	0.10	mg/L	2.50	<0.10 mg/L	118	90-110	3.48	20	M

#### **Batch BAK0504 - No Prep Wet Chem**

<u>Blank (BAK0504-BLK1)</u>										Prepared & Analyzed: 11/15/2017
Alkalinity	<5.0 mg/L	5.0	mg/L							
<u>LCS (BAK0504-BS1)</u>										Prepared & Analyzed: 11/15/2017
Alkalinity	52.0 mg/L	5.0	mg/L	50.0	mg/L	104	80-120			
<u>LCS Dup (BAK0504-BSD1)</u>										Prepared & Analyzed: 11/15/2017
Alkalinity	53.0 mg/L	5.0	mg/L	50.0	mg/L	106	80-120	1.90	20	
<u>Matrix Spike (BAK0504-MS1)</u>		<b>Source: 17K0416-01</b>								Prepared & Analyzed: 11/15/2017
Alkalinity	74.0 mg/L	5.0	mg/L	50.0	24.0 mg/L	100	75-125			
<u>Matrix Spike Dup (BAK0504-MSD1)</u>		<b>Source: 17K0416-01</b>								Prepared & Analyzed: 11/15/2017
Alkalinity	74.0 mg/L	5.0	mg/L	50.0	24.0 mg/L	100	75-125	0.00	20	



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## Certificate of Analysis

### *Final Report*

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

### Certified Analyses included in this Report

Analyte	Certifications
<b>EPA300.0 R2.1 in Non-Potable Water</b>	
Chloride	VELAP,NC,WVDEP
Sulfate	VELAP,NC,WVDEP
<b>RSK175M in Non-Potable Water</b>	
Ethane	VELAP
Ethene	VELAP
Methane	VELAP
<b>SM22 2320B-2011 in Non-Potable Water</b>	
Alkalinity	VELAP,WVDEP
<b>SM22 4500-NO2B-2011 in Non-Potable Water</b>	
Nitrite as N	VELAP,WVDEP
<b>SM22 4500-NO3F-2011 in Non-Potable Water</b>	
Nitrate+Nitrite as N	VELAP,WVDEP
<b>SW8260B in Non-Potable Water</b>	
1,1,1,2-Tetrachloroethane	NC,VELAP,WVDEP
1,1,1-Trichloroethane	NC,VELAP,WVDEP
1,1,2,2-Tetrachloroethane	NC,VELAP,WVDEP
1,1,2-Trichloroethane	NC,VELAP,WVDEP
1,1-Dichloroethane	NC,VELAP,WVDEP
1,1-Dichloroethylene	NC,VELAP,WVDEP
1,1-Dichloropropene	NC,VELAP,WVDEP
1,2,3-Trichlorobenzene	NC,VELAP,WVDEP
1,2,3-Trichloropropane	NC,VELAP,WVDEP
1,2,4-Trichlorobenzene	NC,VELAP,WVDEP
1,2,4-Trimethylbenzene	NC,VELAP,WVDEP
1,2-Dibromo-3-chloropropane (DBCP)	NC,VELAP,WVDEP
1,2-Dibromoethane (EDB)	NC,VELAP,WVDEP
1,2-Dichlorobenzene	NC,VELAP,WVDEP
1,2-Dichloroethane	NC,VELAP,WVDEP
1,2-Dichloropropane	NC,VELAP,WVDEP
1,3,5-Trimethylbenzene	NC,WVDEP
1,3-Dichlorobenzene	NC,VELAP,WVDEP
1,3-Dichloropropane	NC,VELAP,WVDEP
1,4-Dichlorobenzene	NC,VELAP,WVDEP
2,2-Dichloropropane	NC,VELAP,WVDEP
2-Butanone (MEK)	NC,VELAP,WVDEP



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Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

### Certified Analyses included in this Report

Analyte	Certifications
2-Chlorotoluene	NC, VELAP, WVDEP
2-Hexanone (MBK)	NC, VELAP, WVDEP
4-Chlorotoluene	NC, VELAP, WVDEP
4-Isopropyltoluene	NC, VELAP, WVDEP
4-Methyl-2-pentanone (MIBK)	NC, VELAP, WVDEP
Acetone	NC, VELAP, WVDEP
Benzene	NC, VELAP, WVDEP
Bromobenzene	NC, VELAP, WVDEP
Bromochloromethane	NC, VELAP, WVDEP
Bromodichloromethane	NC, VELAP, WVDEP
Bromoform	NC, VELAP, WVDEP
Bromomethane	NC, VELAP, WVDEP
Carbon disulfide	NC, VELAP, WVDEP
Carbon tetrachloride	NC, VELAP, WVDEP
Chlorobenzene	NC, VELAP, WVDEP
Chloroethane	NC, VELAP, WVDEP
Chloroform	NC, VELAP, WVDEP
Chloromethane	NC, VELAP, WVDEP
cis-1,2-Dichloroethylene	NC, VELAP, WVDEP
cis-1,3-Dichloropropene	NC, VELAP, WVDEP
Dibromochloromethane	NC, VELAP, WVDEP
Dibromomethane	NC, VELAP, WVDEP
Dichlorodifluoromethane	NC, VELAP, WVDEP
Di-isopropyl ether (DIPE)	NC, VELAP, WVDEP
Ethylbenzene	NC, VELAP, WVDEP
Hexachlorobutadiene	NC, VELAP, WVDEP
Iodomethane	NC, VELAP, WVDEP
Isopropylbenzene	NC, VELAP, WVDEP
m+p-Xylenes	NC, VELAP, WVDEP
Methylene chloride	NC, VELAP, WVDEP
Methyl-t-butyl ether (MTBE)	NC, VELAP, WVDEP
Naphthalene	NC, VELAP, WVDEP
n-Butylbenzene	NC, VELAP, WVDEP
n-Propylbenzene	NC, VELAP, WVDEP
o-Xylene	NC, VELAP, WVDEP
sec-Butylbenzene	NC, VELAP, WVDEP
Styrene	NC, VELAP, WVDEP
tert-Butylbenzene	NC, VELAP, WVDEP



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8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

### Certified Analyses included in this Report

Analyte	Certifications
Tetrachloroethylene (PCE)	NC, VELAP, WVDEP
Toluene	NC, VELAP, WVDEP
trans-1,2-Dichloroethylene	NC, VELAP, WVDEP
trans-1,3-Dichloropropene	NC, VELAP, WVDEP
Trichloroethylene	NC, VELAP, WVDEP
Trichlorofluoromethane	NC, VELAP, WVDEP
Vinyl acetate	NC, VELAP, WVDEP
Vinyl chloride	NC, VELAP, WVDEP
Xylenes, Total	NC, VELAP, WVDEP

#### *SW9060A in Non-Potable Water*

TOC (Min)	VELAP
TOC (Max)	VELAP
TOC (Mean)	VELAP

#### *SW9215 in Non-Potable Water*

Sulfide	VELAP
---------	-------

Code	Description	Lab Number	Expires
MdDOE	Maryland DE Drinking Water	341	12/31/2017
NC	North Carolina DENR	495	12/31/2017
VELAP	NELAC-Virginia Certificate #9439	460021	06/14/2018
WVDEP	West Virginia DEP	350	11/30/2017



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8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

### Summary of Data Qualifiers

- M Matrix spike recovery is outside established acceptance limits
- P Duplicate analysis does not meet the acceptance criteria for precision
- RPD Relative Percent Difference
- Qual Qualifiers
- RE Denotes sample was re-analyzed
- D.F. Dilution Factor. Please also see the Preparation Factor in the Analysis Summary section.
- TIC Tentatively Identified Compounds are compounds that are identified by comparing the analyte mass spectral pattern with the NIST spectral library . A TIC spectral match is reported when the pattern is at least 75% consistent with the published pattern. Compound concentrations are estimated and are calculated using an internal standard response factor of 1.
- PCBs, Total      Total PCBs are defined as the sum of detected Aroclors 1016, 1221, 1232, 1248, 1254, 1260, 1262, and 1268.



1941 REYMET ROAD  
RICHMOND, VIRGINIA 23237  
(804) 358-8295 PHONE  
(804)358-8297 FAX

Chain of Custody  
Form #: F1331  
Rev. 2.0  
Effective: Jun 28, 2016

### CHAIN OF CUSTODY

PAGE 1 OF 2

COMPANY NAME: EarthCon Site Services		INVOICE TO: EarthCon Site Services	PROJECT NAME: BFS- Hopewell
CONTACT: Matthew Schroeder		INVOICE CONTACT: Matthew Schroeder	SITE NAME:
ADDRESS: 8700 Trail Lake Drive West Suite 101, Memphis TN		INVOICE ADDRESS:	PROJECT NUMBER:
PHONE #: (901)-850-5404		INVOICE PHONE #:	P.O. #:
FAX #:	EMAIL: mschroeder@earthcon.com	Pretreatment Program:	
Is sample for compliance reporting? YES NO		Is sample from a chlorinated supply? YES NO	PWS I.D. #:
SAMPLER NAME (PRINT):		SAMPLER SIGNATURE:	Turn Around Time: <u>Circle: 10</u> 5 Days or <u>  </u> Day(s)

CLIENT SAMPLE I.D.	Grab	Composite	Field Filtered (Dissolved Metals)	Composite Start Date	Composite Start Time	Grab Date or Composite Stop Date	Grab Time or Composite Stop Time	Time Preserved	Matrix (See Codes)	Number of Containers	ANALYSIS / (PRESERVATIVE)					COMMENTS
											VOC-8260 (HCl)	MEE RSK 175 (HCl)	Nitrate (H2SO4)	Alkalinity/Chloride/Sulfate	Sulfide (NaOH+ZnAc)	
1) ASnw-01R	X			11/6/17	13:00	GW	12	X	X	X	X	X				Preservative Codes: N=Nitric Acid C=Hydrochloric Acid S=Sulfuric Acid H=Sodium Hydroxide A=Ascorbic Acid Z=Zinc Acetate T=Sodium Thiosulfate M=Methanol
2) ASnw-02	X			11/6/17	14:30	GW	12	X	X	X	X	X				
3) ASw-W-04	X			11/6/17	11:30	GW	12	X	X	X	X	X				
4)	X					GW	12	X	X	X	X	X				
5) Dup-1	X					GW	14	X	X	X	X	X				
6) Rinsate	X			11/7/17	11/7/17 06:35	GW	4	X	X	X	X	X				
7) Field Blank	X			11/7/17	11/7/17 06:30	GW	4	X	X	X	X	X				
8) Trip Blank	X			11/6/17	11/6/17 07:35	GW	4	X	X	X	X	X				
9)															PLEASE NOTE PRESERVATIVE(S), INTERFERENCE CHECKS or PUMP RATE (L/min)	
<i>[Signature]</i>	DATE / TIME	RECEIVED:		DATE / TIME	QC Data Package	LAB USE ONLY	COOLER TEMP	<i>Sealed</i>								
11/7/17 921		<i>[Signature]</i>	07 Nov 2017	0921	Level III <input type="checkbox"/>		11 °C	<i>in ice</i>								
NQUISHED:	DATE / TIME	RECEIVED:		DATE / TIME	Level IV <input type="checkbox"/>											
NQUISHED:	DATE / TIME	RECEIVED:		DATE / TIME												
NQUISHED:	DATE / TIME	RECEIVED:		DATE / TIME												



## Sample Preservation Log

Order ID 17K0149

Date Performed: 11/7/17

**Sample Preservation Log**  
**Form #: F1301**  
**Rev # 7.0**  
**Effective: Feb 21, 2017**  
**Page 1 of 1**

Page 48 of 50

**NaOH ID:** \_\_\_\_\_

HNO<sub>3</sub> ID: \_\_\_\_\_

|CrVI preserved date/time: \_\_\_\_\_ Analyst Initials: \_\_\_\_\_

H<sub>2</sub>SO<sub>4</sub> | D:

## **Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> ID:**

**Buffer Sol'n ID:**

HCl ID:

## **Na<sub>2</sub>SO<sub>3</sub> ID:**

1N NaOH ID:

5N NaOH:

**THIS DOCUMENT IS UNCONTROLLED WHEN PRINTED**  
E1301 Sample Preparation Log Z-0.xls



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## Certificate of Analysis

### *Final Report*

Client Name: EarthCon Site Services Date Issued: 11/21/2017 14:07  
8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]  
Client Site I.D.: BFS-Hopewell Purchase Order:

## Sample Conditions Checklist

Samples Received at:	1.20°C
How were samples received?	Walk In
Were Custody Seals used? If so, were they received intact?	Yes
Are the custody papers filled out completely and correctly?	No
Do all bottle labels agree with custody papers?	Yes
Is the temperature blank or representative sample within acceptable limits? (above freezing to 6°C) or received on ice and recently taken?	Yes
Are all samples within holding time for requested laboratory tests?	Yes
Is a sufficient amount of sample provided to perform the tests included?	Yes
Are all samples in appropriate containers for the analyses requested?	No
Were volatile organic containers received?	Yes
Are all volatile organic and TOX containers free of headspace?	Yes
Is a trip blank provided for each VOC sample set? VOC sample sets include EPA8011, EPA504, EPA8260, EPA624, EPA8015 GRO, EPA8021, EPA524, and RSK-175.	Yes
Are all samples received appropriately preserved? Note that metals containers do not require field preservation but lab preservation may delay analysis.	Yes



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8700 Trail Lake Drive West Suite 1  
Memphis TN, 38125

Submitted To: Matthew Schroeder Project Number: [none]

Client Site I.D.: BFS-Hopewell Purchase Order:

Sample "Dup-1" logged with a default date/time of 11/6/17 00:00. Matthew  
Schroeder was notified via email.  
BAR 11/7/17 1114

Samples "Rinsate" and "Field Blank" were received in incorrect containers (3 x 40ml  
Voas with H<sub>2</sub>SO<sub>4</sub>).

Matthew Schroeder was notified via email. Samples placed on hold pending client  
instructions.

BAR 11/7/17 1114

As per Matthew Schroeder via phone call, samples "Rinsate" and "Field Blank" are  
to be run for TOC-Quad SW9060 and Nitrate+Nitrite SM4500.

BAR 11/7/17 1140